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U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
MARION B. FOLSOM, *Secretary*

PUBLIC HEALTH SERVICE
LEROY E. BURNEY, *Surgeon General*

Urban Dental Expenditures

SELMA MUSHKIN and BEATRICE CROWTHER

Out-of-pocket dental expenditures of the urban population amounted to about $10 per person in 1950. They accounted for about 15 cents of each $1 of total out-of-pocket medical care expenditures. The average urban family spends about $30 a year for dental care as compared with $197 for all medical and health services.

Dental expenditures are highly concentrated. Almost half of the more than $900 million spent on dental care by urban families in 1950 represents the spending of less than 5 percent of the city population. About 48 percent of urban families reported no dental outlays.

Dental expenses take a larger share of the medical care dollar at ages 6–18 years than at other ages. About 28 percent of all medical spending for children of these ages goes for dental care. In contrast, only 7 percent of the medical care expenditures of those 65 years or over goes for dentistry. Dental bills of $100 or more, however, take a larger share of the dental dollar of the middle and older age groups.

DATA COLLECTED from families surveyed by the Bureau of Labor Statistics in its 1950 study of spending habits among city families provide a basis for analyzing some aspects of the dental expenditure patterns in urban areas, where dental resources and facilities are relatively more ample than they are in rural places (*1*). They provide information on the concentration of dental expenses, which other surveys have by and large neglected, but which may throw some light on the financial problem of prepayment of dental services.

The design and coverage of the Bureau of Labor Statistics survey were outlined in an earlier article (*2*). In summary, the Bureau of Labor Statistics interviewers obtained complete and useful information on family income and spending habits for 12,489 families, including single-person consumer units.

As a basis for a study of medical care spending variations by age groups, the Public Health Service drew a random subsample of the Bureau of Labor Statistics schedules and tabulated the information reported by the families on expenditures of individual family members. In selecting the subsample the interview schedules were stratified by the amount of total medical care expenditures. The subsample included all schedules reporting expenditures of $1,000 or more, 50 percent of those reporting $400 to $1,000, 20 percent of those reporting $200 to $400, and 10 percent of those reporting some medical care expenditures but in amounts less than $200. To provide a basis for evaluating medical care received by public beneficiaries, such as public assistance recipients, 50 percent of the schedules reporting no medical care expenditures were also included in the subsample. A total of 2,414 consumer units composed of about 7,639 persons were included in the subsample.

Data on family expenditures are based on tabulations of 12,489 consumer units interviewed by the Bureau of Labor Statistics. Data on individual expenditures are based on the subsample of 2,414 consumer units.

Dental expenses reported in the survey represent out-of-pocket charges incurred by members of the family for the broad range of

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Miss Mushkin, an economist, and Miss Crowther, a research analyst, are with the Division of Public Health Methods, Public Health Service.

Table 1. Average out-of-pocket expenditures per family for dental care and for direct medical care, by income group, urban population, 1950

Income group	Dental expenditures		Total direct medical expenditures [1]	
	All families	Families with dental expense	All families	Families with medical expense
All income groups	[2] $30	$58	$163	$175
Under $1,000	7	43	82	105
$1,000–$1,999	10	35	80	94
$2,000–$2,999	17	54	120	129
$3,000–$3,999	27	46	159	166
$4,000–$4,999	35	52	178	184
$5,000–$5,999	41	56	205	209
$6,000–$7,499	56	75	248	253
$7,500–$9,999	64	82	338	345
$10,000 and over	96	116	390	394

[1] Excluding health insurance premiums but including dental expenditures.
[2] Averages adjusted to Bureau of Labor Statistics aggregate medical care expenditures per consumer unit and 91-city distribution of expenditures by class of service.

dental services, including dentures and dental X-rays. Drugs purchased on the prescription of a dentist are excluded from dental expenses.

Family Dental Expenses

Urban families in 1950 spent an average of about $30 for dental care; excluding families who made no expenditure, the average was about $58 (table 1). Converting the $30 family average to a nationwide estimate of urban family dental spending yields a figure of some $945 million, a figure which is high when compared with national income account estimates of personal consumption for dental care. This divergence between family survey estimates of aggregate dental care expenditures and the national income estimates of the Department of Commerce derived from income surveys of practitioners has been noted by others (*3–5*). Additional study is required to analyze these differences and determine the origin of the divergencies and the conceptual and reporting problems involved.

The data on urban family expenditures underscore the special characteristics of dental spending which mark it as different from other medical outlays. For one thing, a large proportion of consumers do not purchase dental care in a given year. In 1950 about 48 percent of the urban families reported no expenses for dental care. In contrast, only 7 percent of the families reported no spending for direct health services, that is, spending for medical care exclusive of health insurance premiums (table 2).

Dental care spending by income groups varies more sharply than other medical care costs. Average family dental expenditures of the $1,000 to $2,000 income group, for example, are about one-tenth of the average dental expenditures of families with incomes of $10,000

Table 2. Percentage of families reporting out-of-pocket expenditures for dental care and direct medical care, by income group, urban population, 1950

Income group	Dental expenditures	Direct medical expenditures [1]
All income groups	52	93
Under $1,000	16	78
$1,000–$1,999	28	85
$2,000–$2,999	31	93
$3,000–$3,999	59	96
$4,000–$4,999	66	97
$5,000–$5,999	73	98
$6,000–$7,499	76	98
$7,500–$9,999	78	98
$10,000 and over	83	99

[1] Excluding health insurance premiums but including dental expenditures.

and over. Average expenditures for direct medical care of the $1,000 to $2,000 income group are about one-fifth of the average expenditures of families with incomes of at least $10,000. This difference is attributable largely to the variation in the proportion of families in different income groups who use paid dental services. Almost 3 times as great a proportion of families with an income of $10,000 or more report dental expenses as do families with an income of $1,000 to $2,000. There is little difference between the high and lower income groups in the proportion of families reporting some direct medical expenditures.

The average spent for all direct medical expenditures (that is, excluding insurance premiums) by families reporting some expenses is 4.2 times as high for families with an income of $10,000 or more as for families with an income of $1,000 to $2,000. In contrast, average dental expense of the $10,000 and over income family reporting some dental expenditures is only 3.3 times that of the $1,000 to $2,000 income family.

Within these averages there is considerable variation depending on the age of family members and family size, as well as other characteristics.

Age Differentials

The pattern of age differentials in dental spending for urban residents is similar to that obtained by the Health Information Foundation in its 1952–53 survey of both rural and urban families (*6*). Dental charges in the Health Information Foundation study averaged $10 per person, with a high of $14 per person 35–54 years of age and lows of $4 per person 65 years of age or older and $1 per person under 6 years of age. In the Public Health Service study, limited to urban residents, the high is $13 for those 19–44 years of age, and the low is $2 for children under 6 (table 3). The average expenditure for urban persons 65 and over in the Public Health Service study is $6, compared with the Health Information Foundation average of $4 in both urban and rural areas. (The percentage distributions by age group of the Public Health Service sample, of the urban population, and of dental expenditures are given in table 4.)

Table 3. Average out-of-pocket expenditures per person for dental care and for all medical care, by age group, urban population, 1950

Age group (years)	Average dental expenditures		Total medical expenditures [1]
	Amount	Percent of total medical expenditures	
All age groups	[2] $10	15.2	[2] $65
Under 6	2	6.1	29
6–18	10	28.5	35
19–44	13	17.4	72
45–64	11	12.1	93
65 and over	6	7.2	83

[1] Including health insurance premiums and dental expenditures.
[2] Averages adjusted to Bureau of Labor Statistics aggregate medical care expenditures per consumer unit and 91-city distribution of expenditures by class.

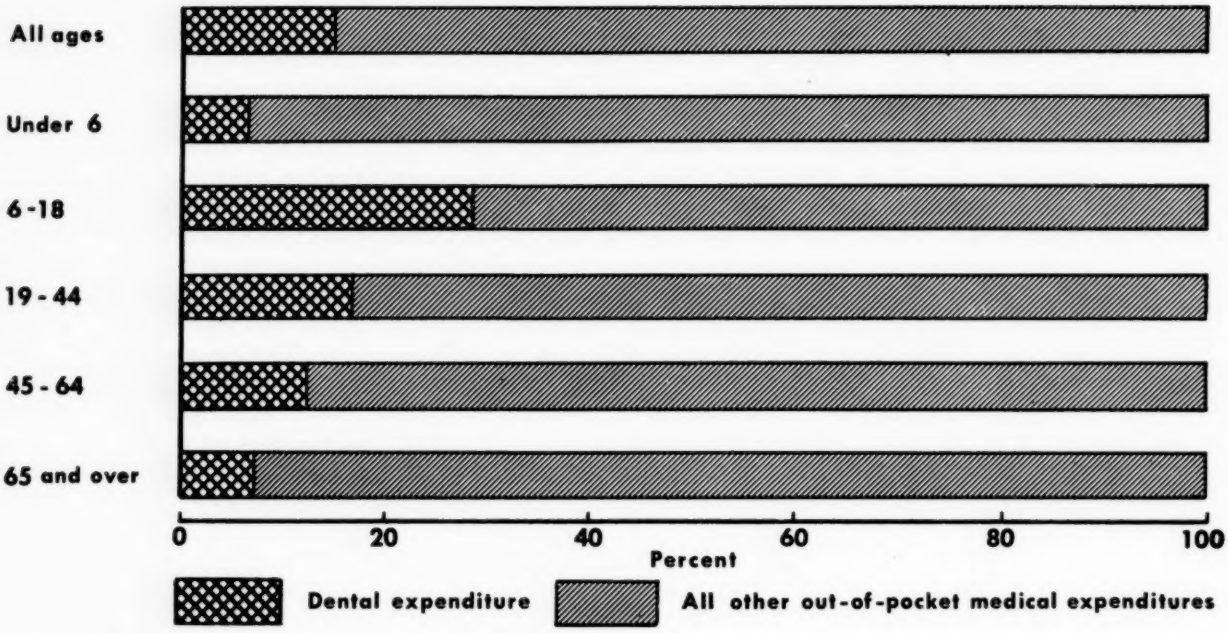
While dental expenses account for 15 percent of total medical care expenditures of all urban residents, they account for 28.5 percent of the total medical spending for those 6–18 years of age (fig. 1). Dental expenses account for about 7 percent of total medical spending of persons 65 and over and for only 3 percent of expenditures of those 75 and over.

These averages reflect the appreciable proportion of persons in each age group who had no dental expenses during the year. Almost 70 percent of urban residents of all ages incurred no dental expenses. Excluding children under

Table 4. Percentage distribution of urban population and urban out-of-pocket dental expenditures, by age group, 1950

Age group (years)	Percent of urban population		Percent of dental expenditures
	In sample	In United States	
All age groups	100.0	100.0	100.0
Under 6	12.7	11.9	2.3
6–18	19.1	17.6	19.3
19–44	38.3	41.1	48.8
45–64	21.3	21.3	24.3
65 and over	8.6	8.1	5.3

Figure 1. Dental expenditures as percentage of total out-of-pocket medical care expenditures, by age group, 1950.



6 years because dental services are usually not initiated until the child reaches 3 or 4 years of age (*7*), the proportion of persons reporting no dental expenses increases from 60 percent for those 6 through 44 years of age to 87 percent at ages 65 years and over (table 5).

Concentration in Expenses

Not only is the proportion of families purchasing dental services substantially higher in the upper income groups but a large part of all dental expenditures is accounted for by the spending of a small part of the population. For all age groups combined almost half of the dental expenditures are made by individuals spending $50 or more a year for dental care. The concentration of expenses differs considerably by age: In the 6–18 age group only 30 percent of dental expenses are in amounts of $50 or more, and in the 45–64 age group almost two-thirds of the expenses are above $50 per year (table 6).

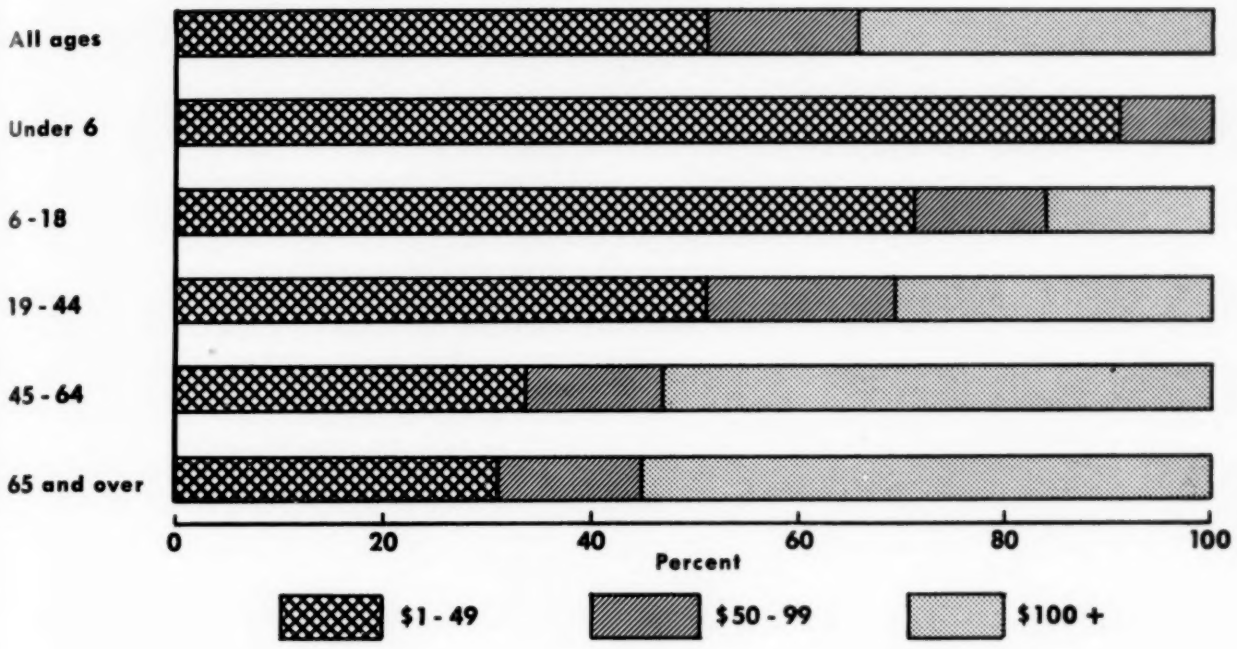
Although a smaller proportion of the urban population in the upper age groups incurred dental charges, a large part of their dental bills

Table 5. Percentage distribution of persons in each age group by amount of out-of-pocket dental expenditures, urban population, 1950

Dental expenditures	Age group (years)					
	All ages	Under 6	6–18	19–44	45–64	65 and over
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0
None	69. 5	91. 4	60. 4	60. 5	73. 8	86. 7
$1–$49	25. 7	8. 3	36. 4	33. 0	19. 7	9. 6
$50–$99	2. 6	(0. 3)	2. 4	3. 9	2. 5	1. 4
$100–$199	1. 6	0	. 5	1. 8	3. 0	1. 8
$200 and over	. 6	0	. 3	. 8	1. 0	. 5

NOTE: Figures are shown in parentheses when the product of the percentages and the unweighted count of persons in the sample in the given age group is less than 10.

Figure 2. Percentage distribution of dental expenditures by size of expenditure and age group, 1950.



was made up of annual bills of $100 or more or even $200 or more (fig. 2). About 1 percent of children 6–18 years of age incurred dental charges of $100 or more, and the charges in these amounts accounted for 16 percent of the total dental spending for this age group. By way of comparison, about 4 percent of persons 45–64 years of age incurred annual dental charges of $100 or more, but their bills represented more than $1 out of each $2 of the total dental spending of urban residents of those ages. Their charges of $200 or more represent more than $1 out of each $5 spent by those 45–64 years of age.

Differences in spending patterns reflect in part differences in the nature of dental care needs associated with age. The large dental bills are of lesser importance in dental spending for children under 19 years of age than in dental spending of the middle or upper ages. More than 90 percent of the dental expenses for children under 6 years and about 70 percent of the dental expenses for children 6–18 years are in amounts less than $50; only 10 percent of the

Table. 6. Percentage distribution of out-of-pocket dental expenditures of each age group by amount of expenditures, urban population, 1950

Dental expenditures	Age group (years)					
	All ages	Under 6	6–18	19–44	45–64	65 and over
Total	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0
$1–$49	50. 6	91. 2	70. 9	51. 0	34. 1	30. 9
$50–$99	15. 5	(8. 8)	13. 2	18. 3	12. 8	13. 8
$100–$199	18. 7	0	5. 9	16. 6	31. 2	34. 9
$200 and over	15. 2	0	10. 0	14. 1	21. 9	20. 4

NOTE: Figures are shown in parentheses when the product of the percentages and the unweighted count of persons in the sample in the given age group is less than 10.

charges for those 6–18 are in amounts of $200 or more. Preventive dentistry at preschool ages may help to reduce that part of these expenses attributable to dental neglect.

Trends in Spending

Estimates of dental expenditures published each year by the Office of Business Economics of the Department of Commerce indicate that the share of total medical care spending represented by dental expense has decreased (*8, 9*). In 1929 dental expenses represented 16 percent of personal medical care expenditures; in 1950, 10 percent; and in 1956 (the latest year for which data are currently available), about 9 percent. Household survey data similarly indicate some but not as marked a decline in the share of medical spending going for dental services. This decline is attributable in part at least to the reduced dentist-population ratio.

In the survey data of the Committee on the Costs of Medical Care for 1928–31, dental care represented about 18 percent of total private medical spending. The Health Information Foundation survey indicates that about 16 percent of gross medical charges went for dental services in 1952–53. The Bureau of Labor Statistics data indicate that 15 percent of out-of-pocket medical expenses of urban consumers went for dentistry in 1950.

Dental spending per person increased during the 20-year period from $6.41 for cities of 5,000 and over population in 1928–31 (*10a*) to $10 for urban areas in 1950. However, medical expenses per person increased more. In 1928–31 the city average per person was $30.90 (*10b*); in 1950 the city resident average was almost $65. (These figures are in current dollars for the year in which they were reported.)

It is not surprising in view of the increased complexity of medical care, the number of new types of professional and paramedical skills comprising the "medical care package," and the spread of prepayment coverage that dental expenditures have declined somewhat in relation to total medical spending.

Utilization of dental services has increased somewhat. In 1928–31, 74.4 percent of persons in cities of 100,000 or more population and 78.5 percent of persons in cities with populations of 5,000 to 100,000 incurred no expenses for dental care (*10c*). In 1950, 69 percent of urban residents reported no dental expenses. This is remarkably little improvement in utilization when account is taken of the typical pattern of dental spending in relation to income and the rise in average family income since the survey of the Committee on the Costs of Medical Care. (Factors other than income—education and social status, in particular—influence utilization of dental services, but this study provided information only on the relation to income.) Typically, dental spending, both in the percentage of persons incurring dental expenses and the average amount of expenses, rises with family income. Why has the rise in income levels and improved distribution of income among families not been reflected in a more substantial improvement in use of dental services? Similarly, why has the increased urbanization of the population not resulted in substantially increased dental care? Part of the problem may lie in the lack of comparability of the survey data and in the inadequacies of family reporting in the medical expenditure surveys. In part it may be attributed to the decline in the ratio of dentists to population.

The National Health Survey now under way will provide data for evaluating utilization of dental services among the general population in both rural and urban areas. This survey, moreover, will provide data on the types of dental services used by different groups in the population.

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films

Laboratory Diagnosis of Ringworm In Animals

I. *Microsporum* Infections
II. *Trichophyton* Infections

35-mm. filmstrip, color, sound, 8 minutes, 47 frames and 12 minutes, 60 frames, respectively, 1957.

Audience: Veterinarians, physicians, and mycological laboratory technicians.

Microsporum gypseum macroconidia.

The clinical features of *Microsporum* and *Trichophyton* ringworm in animals are described, followed by demonstrations of methods for examining the animals with the Wood's light and for collecting specimens for laboratory study.

The laboratory methods consist of examining the clinical materials, inoculating culture media, and in case of *Microsporum* identification of the two important species *canis* and *gypseum* and of *Trichophyton*, *mentagrophytes*, *equinum*, *verrucosum*, and *gallinae*.

The mode of transmission of infections from animal to man and the appearance of the infections in man are illustrated.

These films are available on short-term LOAN from the Communicable Disease Center, Public Health Service, 50 7th Street NE., Atlanta 5, Ga., and by PURCHASE from United World Films, Inc., 1445 Park Avenue, New York 29, N. Y.

"Anyone for Nursing?"

16-mm. filmograph, color, sound, 17 minutes, 1957.

Audience: Schools of nursing, nursing organizations, and high school career guidance groups.

This filmograph covers in detail nursing activities and opportunities in Public Health Service hospitals, in the Indian and international health programs, in research nursing at the National Institutes of Health, and public health nursing programs generally.

The story is presented in a light, gay manner throughout, with an occasional cartoon and simple animation.

This film is available on short-term LOAN from the Recruitment Branch of the Division of Personnel, Public Health Service, Washington 25, D. C., and by PURCHASE ($60 per print) from the Communicable Disease Center, Public Health Service, 50 7th Street NE., Atlanta 5, Ga.

Child Care Problems of Physically Handicapped Mothers

16-mm. film, color, sound, 30 minutes, 1957.

Audience: Professional personnel and lay people interested in problems of the handicapped mother.

The film, made in 8 different homes, shows the problems of 1 normal mother, 3 wheelchair mothers, 1 amputee mother, 1 mother with muscular weakness, 1 using a crutch, and 1 with a leg brace. It points up the need for expanding programs to include more of the 10 million handicapped homemakers in the United States.

It was produced by the School of Economics, University of Connecticut, in cooperation with the Connecticut Team Approach Committee on Research Demonstrations and Workshops Concerning Physically Handicapped Women, and the Office of Rehabilitation, Department of Health, Education, and Welfare.

Address inquiries on borrowing and purchase to Audio Visual Center, University of Connecticut, Storrs, Conn.

Biennial Conference of State and Territorial Dental Directors with the Public Health Service and the Children's Bureau, Washington, D. C., June 19–21, 1957.

Dental Services for Special Groups

CONFERENCE REPORT

DENTAL CARE services for the indigent, the mentally retarded, public assistance recipients, and other population groups were discussed by dental directors attending the Biennial Conference of State and Territorial Dental Directors with the Public Health Service and the Children's Bureau held in Washington, D. C., June 19–21, 1957.

Dental directors attending the conference were welcomed by Katherine B. Oettinger, chief of the Children's Bureau, and Dr. Leroy E. Burney, Surgeon General of the Public Health Service. In a following address Dr. John W. Knutson, chief dental officer of the Service, urged increased emphasis on the promotion of fluoridation. He also pointed out that the changing trend in public health from infectious diseases to long-term illnesses will require close cooperation of the medical and dental professions to achieve new public health goals.

One of the sessions of the conference was devoted to a series of table clinics on dental statistics, dental hygiene, traineeships, Hill-Burton dental facilities, fluoridation and defluoridation, group payment plans, public assistance, and research grants. Summaries of the other discussions follow.

Local Dental Clinics

Local dentists provide the technical skills and local health officers set the policies for local health clinics in Georgia, according to Dr. John E. Chrietzberg, director of dental health service, Georgia Department of Public Health. In addition, consultants from local, regional, and State health departments take part in organizing and operating the clinics.

One of the first steps taken by the department of health in developing a clinic is to ask the community to set up an advisory committee. This committee is made up of several dentists, school people, representatives from the welfare department, public health personnel, and representatives from the PTA, service clubs, and other groups with specific interests in a service program.

Chrietzberg said that the committee is asked to establish a means test, which is not done at the State level. The State health department generally advises the committee and provides it with the methods that are being used in other communities. Committee members help raise local funds for transporting youngsters and maintaining the clinic. They also help to buy supplies. "All this makes the community feel it is their clinic," he said, "and consequently, the clinics are effective and most likely permanent."

Of the 45,932 children admitted to the 116 clinics in Georgia, 16,000 received complete treatment; 29,932 received only partial treatment, but many of these received total treatment of permanent teeth. The total cost of the program was $69,745.

Payments by the clinic are modest, the dentist receiving $5 and the assistant $1 an hour. In Chrietzberg's opinion, the experience might well prove helpful some day in planning prepayment dental plans on a maintenance pro-

gram. The clinical program has also encouraged many dentists to do more dental work for children.

Indigent Care in Maryland

Private dental office treatment for indigents provided by the Maryland medical care program was described by Dr. Edward Davens, deputy director of public health, Maryland State Health Department. Presumably programs of this kind can be developed in nearly all States, he said, citing the amendment of the Social Security Act of last year which will provide medical and dental funds to States for four categories of public assistance: old-age assistance, aid to the permanently and totally disabled, aid to dependent children, and aid to the blind. In most States the funds will be administered by welfare departments.

In the cleft-palate program, the clinic approach is integrated because the problem is not limited to cosmetic or plastic surgery, but involves communication and dental as well as medical and audiological problems. The program is operated jointly by the State health department, the Johns Hopkins University School of Medicine, and the University of Maryland Dental School.

Davens concluded with the hope that there would be a continuing emphasis on the fluoridation of public water supplies in Maryland. "Today," he said, "85 percent of our people who use central water supplies drink fluoridated water."

The Mentally Retarded

In Pennsylvania, if an agency bears the cost of providing dental treatment to mentally retarded and cerebral palsied children who are indigent or if the dentist gives free treatment to such patients, the State health department will pay for hospitalization of patients requiring general anesthesia or special techniques applicable only in a hospital. According to Dr. Linwood G. Grace, director, division of dental health, Pennsylvania Department of Health, who described the program, very few dentists would accept mentally retarded and cerebral palsied children at the outset. There was a great need to improve the dentist's knowledge of the necessary technique.

With the cooperation of the University of Pennsylvania in Philadelphia and the University of Pittsburgh, three training courses were conducted to teach practicing dentists the required special techniques. The courses were highly successful, he said, and will probably be repeated as the program grows.

Children's Bureau Program

The $1 million earmarked by Congress for special projects and services for mentally retarded children in fiscal year 1957–58 is being used by the Children's Bureau for demonstrations or pilot programs in 24 States, reported Dr. Arthur J. Lesser, director, Division of Health Services, Children's Bureau. These programs, while providing clinical services, emphasize treatment of the more severely retarded and younger children. The medical or clinical components are basic, but a team approach integrates the services of a physician, social worker, and psychologist.

"Only 10 percent of retarded children are in institutions," Lesser said. "Most parents want to keep their children at home, but they need help if they are going to do a good job."

In 1955, some 278,000 children received services from physicians under this program. About half of these children have an orthopedic handicap, and the rest have various conditions such as heart disease, cleft palate, epilepsy, and cerebral palsy. The increase in the numbers of children in this program since about 1940 has been largely in the nonorthopedic groups.

Lesser explained that treatment of the crippled child has moved away from the almost exclusively orthopedic and plastic surgery programs to one which is becoming a pediatric program for children with long-term illnesses or physically handicapped conditions.

A considerable amount of program funds goes into training of all sorts: dentistry, maternity care, public health, audiology, and so on.

Public Assistance Programs

Discussing dental care for public assistance recipients, Dr. Thomas B. McKneely, medical consultant, Bureau of Public Assistance, Social Security Administration, outlined the four categories of "needy" persons covered by Fed-

eral aid to States: persons 65 years of age and older; persons who are blind; dependent children; and persons who are permanently and totally disabled.

These four groups in January 1957 included more than 5 million individuals who received assistance amounting to over $227 million.

The primary purpose of public assistance, he said, is to help needy people secure the basic necessities for living, such as food, shelter, clothing, and other items. The Bureau of Public Assistance has long recognized medical care as one of the basic necessities, and Federal matching funds within the maximum have been available to the States.

Before 1950, matching money was available only for unrestricted payments to the recipients. Amendments to the law in 1950 permitted Federal sharing in payments made directly to vendors of medical services. The 1956 amendments established a separate matching formula for medical expenditures. This formula makes available to States a monthly amount not in excess of one-half of $6 times the adult recipients in each category and $3 times each child included in the aid to dependent children category. Money under this formula is granted to States on the basis of the amount expended each month. Each category is a separate program with separate fiscal accounting. Thus, funds unexpended in one are not transferable to another category.

Dental care comes within the broad definition of medical care. A 1946 study of medical care in public assistance showed that out of each dollar spent, dental care accounted for 3 cents in the old-age assistance category; 12 cents for aid to dependent children; and 9 cents for aid to the blind. The proportion of the caseload receiving dental care during the 1946 study period by category was, respectively, 1.4 percent, 4.8 percent, 2.5 percent. There was no program for aid to the permanently and totally disabled. Although the figures are old, McKneely said, they do show there was some dental care in the program and that there was recognition of the greater need among children for dental care.

The Bureau of Public Assistance, he continued, does not require a State to include medical care in its plan. It is a State option to provide none, little, or much medical care. Because there is little expensive long-term medical care in the aid to dependent children caseload it is expected that more funds will be available for dental care. States are being urged to give consideration to expanding dental care for children. Professional guidance in this area is needed, McKneely feels.

Vocational Rehabilitees

The goal of the State program of the Office of Vocational Rehabilitation is restoration of physically handicapped adults to gainful employment through provision of appropriate medical, dental, social, and educational services, stated Dr. Samuel S. Herman, acting medical director, Office of Vocational Rehabilitation. Although data are scanty, there is evidence that participation by dentists in this program has been little more than minimal, despite the substantial growth during recent years in State, Federal, and private funds for vocational rehabilitation.

Well-defined circumstances under which dental defects may be considered vocationally handicapping are the disabilities of persons with cleft palates or of those who have had extensive facial surgery for removal of a malignancy. In these instances, Herman said, unintelligible speech, cosmetic deformity, and inability to eat may be substantial employment handicaps. In such cases, the dentist is called upon to provide services ranging from operating procedures to providing complex prostheses and appliances.

In other instances, the defects may not of themselves represent a substantial employment handicap, but may directly contribute to the severity of another condition which hinders employment. He gave as an example severe peripheral facial paralysis traceable, in the opinion of the examining neurologist and dentist, to a dental focus of infection.

A more frequent need for dental services in the vocational rehabilitation program arises in connection with an employment handicap stemming from multiple disabilities. If a combination of disabilities makes it impossible for the individual to work, it may be necessary to provide corrective measures, including compre-

hensive dental care, to bring about a state of health conducive to satisfactory functioning on the job.

State agencies are encouraged by the Federal office not to establish arbitrary limitations on the types of dental services provided, nor on the amount of money expended for this purpose.

The Office of Vocational Rehabilitation, Herman concluded, also encourages a free choice of dentists and change of dentist either at the request of the client or the dentist.

Care for Handicapped Children

Children with such conditions as cerebral palsy, mental retardation, and muscular dystrophy suffer from the dental neglect and poor care that prevails in many parts of the world, according to Dr. Manuel M. Album, research associate in oral pathology, University of Pennsylvania School of Dentistry. He maintained that recognizing the existence of such dental conditions in these children and the fact that poor dental health is closely related to the overall physical health of the child should be a prime concern of the dental profession. "Dentists have been somewhat reluctant and indifferent in their treatment of these children. The fear of inflicting injury to themselves, as well as to their patients, is caused by their lack of information on the medical backgrounds of the children."

The necessities of everyday living is an important part of the child's motivation and integration into normal life. The desire and willingness of these children to learn and the competitiveness they exhibit makes one realize the deep feeling they have for recognition.

They should receive the same dental care as our own children, Album said. Primary teeth should not be injudiciously extracted, but should be allowed to follow normal growth patterns. Badly decayed teeth, loss of teeth, and severe cases of malocclusion restrict the progress of speech in these children.

According to Album, there is no such thing as an untreatable child, no matter how severe his physical or mental condition might be. With today's modern methods one can insure good, thorough dental treatment. Because of the child's condition, it may become necessary to adjust the approach and treatment to the individual patient. Cavity preparation and filling should generally correspond to the normal, daily routine.

Clinical procedures should be attempted in the dental office without the use of medication, he said, since this procedure enables the dentist to become better acquainted with the child and his condition. Local anesthesia can be given for cavity preparation as well as for single extractions. If it becomes impossible to work under normal means, the patient can be given one of the muscle relaxing agents or premedication. If all of these measures fail, then the child should be admitted to the hospital.

After the child has received a thorough physical examination and been found suitable for general anesthesia, all of the dental work can be done at one time and the mouth completely rehabilitated. Following this technique, personalities often improve rapidly and children who were difficult to work with in the dental office become excellent patients. The technique enables the dentist to establish a starting point for future dental needs. Album warned against the dentist's use of this method as a crutch or tool to slough off his obligations to the child. It should only be used as a last resort when other procedures fail, he said.

"Children with a handicap must be respected as individuals, so that they can attain their rightful place in society, he concluded."

The Dental Profession

Dr. J. H. Eshleman, chairman of the American Dental Association's Council on Dental Health, reviewed the guiding principles set by the association to aid its agencies in developing dental care programs operated under the auspices of the Federal Government and to assist constituent societies in developing special programs giving dental care to specific groups.

In these programs, the dental profession has established dentistry as a basic health service in the health programs of the Nation and has attempted to integrate dental care into general health care. The development of health pro-

grams for persons with mental and chronic illnesses and the expansion of hospital facilities for the care of such patients are accompanied by a growing recognition of the need for complete dental departments in all types of hospitals. Chronic illness programs, added Eshleman, must provide for the homebound patient who does not require hospitalization but who does require dental care.

He noted that emphasis in health programming has shifted from the individual to the group. Consequently, the profession's expanding knowledge and skill in the management of dental disease must be adapted to the socioeconomic environment of patients, the study of which demands the aid of other sciences such as sociology. Furthermore, the future of dental practice depends on fuller use of the specialized resources of business administration, production technology, and production efficiency.

Eshelman pointed out that there is a trend toward the development of many different forms of group dental practice. Efforts are being directed toward the goal of eliminating the heavy burden of costs for dental health services. An essential and accompanying effort must be made to strengthen the capacities of the State and local dental societies and dental components of health departments.

Dental Resource Studies

"Effective resource studies are not limited to counting heads and viewing with alarm the shortages in personnel which the count reveals," said Dr. Walter J. Pelton, chief of the Division of Dental Resources, Public Health Service. These studies, he asserted, must explore any areas of activity directly or indirectly affecting dentistry's efforts to protect and improve America's oral health. The Division of Dental Resources makes a continuing effort to do this, as indicated by its activities in the last fiscal year.

Pelton cited the division's study in 1956 of requirements through 1975 for dentists and dental hygienists in 11 western States, Alaska, and Hawaii. Prepared for the Western Interstate Commission for Higher Education, the booklet entitled "Dental Manpower Requirements in the West," was published by the commission in July 1956. A similar study of 16 southern States was conducted in cooperation with the Southern Regional Education Board, which is planning its publication. These studies and two others now in the initial stage—one covering New England and the other, all 48 States—will provide a working base for long-range planning needed to offset the decline in dentist supply.

In education, said Pelton, the division completed a survey of characteristics, finances, and practice plans of dental and dental hygiene students in cooperation with the Council on Dental Education of the American Dental Association. Originally published in the association's journal, it has been reissued as a pamphlet entitled "How Students Finance Their Dental Education." Two additional articles, "The Hygienist as a Student" in the *Journal of the American Dental Hygienists' Association*, October 1956, and "Costs and Income Sources for Dental Students" in *Public Health Reports*, May 1957, are based on the survey, and another, containing added information on loans and scholarships, is in preparation.

Pelton then described two major research programs in educational methods which were also begun in 1956. The first is a pilot project to determine the best techniques for training dental students to work with chairside aides. Although it is only in its first year, 3 of the 5 schools signing cooperative agreements have started active training projects. Probably more schools can be expected to participate in the future. The second program, a study of dental assistants and their jobs, will augment a joint project of the American Dental Assistants' Association and the American Dental Association concerned with training courses for assistants and accreditation standards. Both of these programs are designed to aid development of better curriculums and training methods and to promote more efficient use of professional skills, integral parts of resource planning.

One of the Public Health Service series of manpower surveys, entitled "Health Manpower Source Book, Section 8: Dental Hygienists," has been completed by the division. Pelton feels that it is probably the most complete

analysis of current professional status, availability, and future need for dental hygienists.

Prepaid dental care, expected to have a great impact on dental demand, is a long-term research program. Two conferences were held, the first with prepayment executives, health economists, and dental leaders, and the other with health insurance company representatives; others are in the planning stage. A report entitled "Predictability of Dental Care Needs of Adults" was published in the *Journal of the American Dental Association*, June 1956, and two others, "Dental Experience of the St. Louis Labor Health Institute" and "Utilization Patterns of Free Clinic Facilities by Two Population Groups," are in progress. These studies, analyzing various types of utilization, chair-time, and need patterns in group clinics, should provide important facts in an area for which available data are limited and unsatisfactory, said Pelton.

Also in preparation is a catalog of all existing prepayment plans with details of organization, eligibility rules, coverages, and rates.

He then listed the projects which may be included in the division's future research in prepayment plans:

- An extension of the study of utilization patterns in the Group Health Association dental clinic, Washington, D. C. Supplementing a 1954 report entitled "Comprehensive Dental Care in a Group Practice," it will emphasize long-term service demand patterns.
- The organization and operation of State dental service corporations to study ways by which such a corporation serves as intermediary between dentists and groups seeking dental care.
- The organization, operation, and implications of postpayment dental plans.

"Because of the nature of its research," Pelton said, "the Division of Dental Resources needs and has always received the interest and cooperation of leaders in many fields. That this interest has not died with the publication of our studies but is instead being translated into intelligent and forward-looking action, is, after all, the real achievement of the year's work."

Fluoride Effects on Tooth Surfaces

A study comparing benefits to individual permanent teeth when fluoride ingestion starts at birth and at various ages was described by Grace C. Scholz, statistician, Division of Dental Public Health, Public Health Service. Her report was preliminary to preparation of the full results of the study for publication, she said.

The study, made during 1944–55, was based on the results of 71,000 dental examinations of children aged 5–16 with continuous residence in Grand Rapids and Muskegon, Mich., and Aurora, Ill. These children were grouped on the basis of their homogeneity with respect to age and the length of time they had been drinking fluoridated water. Data for each tooth space of each group were tabulated, and standard statistical measures were used for comparing groups.

Fluoridation

Cities treating their water with alum can now cut the cost of fluoridation at least two-thirds by using fluorspar instead of some other fluoride compounds, according to Franz J. Maier, chief of the Engineering and Chemistry Laboratory, Division of Dental Public Health, Public Health Service.

Heretofore, fluorspar, the least costly of all fluoride compounds, could not be used for fluoridating water supplies, said Maier. It does not dissolve readily. This difficulty was overcome by the development of a fluorspar dissolver. In feeding the fluorspar, an alum solution dissolves the compound, which is fed into the water by a solution feeder.

Nonfluoride Hypoplasias

The great majority of enamel hypoplasias commonly seen is not due to fluoride ingestion, reported Dr. Albert L. Russell, chief, Epidemiology and Biometry Branch, National Institute of Dental Research, Public Health Service. Therefore, he maintained, care should be taken in excluding such cases when computing the community fluorosis index. Incorrect diagnosis of nonfluoride enamel hypoplasias as fluoride-caused has caused confusion, among serious workers in this field, as to the meaning and severity of fluorosis. It has provided plau-

sible if spurious arguments against fluoridation of community water supplies.

Reports of the prevalence of nonfluoride enamel opacities differ and some of the differences may be real, Russell said. Hurme reported one or more opacities in 83 percent of the children in a new England community; Zimmerman saw 36 percent in a Maryland group; Syrrist found "white spots" in 19 percent of a Norwegian group; Parfitt reported a 50 percent prevalence in London children; and Forrest, a 70 percent prevalence in children of Essex and Surrey; both Davies and Russell found such opacities in about 20 percent of the children in Kingston, N. Y. Not one of these groups used a domestic water with more than 0.2 p.p.m. F, so that none of these opacities could have been due to fluoride ingestion.

Both Davies and Forrest, Russell continued, make the point that these common nonfluoride opacities are much more disfiguring than the slight fleckings seen in communities with about 1.0 p.p.m. F. In children of Essex and Surrey, Forrest found blemishes so severe that they would have been classified as moderate, had they been due to fluoride, in 17 of 259 cases.

In this situation the obligation of the dental public health worker is plain: to learn to diagnose these conditions in the field and to determine their prefluoridation prevalence and character in order to avoid their being ascribed, post hoc, to change in the water supply.

Retirement Histories Studied

The Social Security Administration is asking 3,000 newly retired persons throughout the country to report over the next 12 years how they get along in retirement.

Information obtained through a series of interviews with the older persons will be part of a long-range study to provide more information about the circumstances and problems encountered by social security beneficiaries in their later years.

After the initial interviews in 1958, followup visits in the homes of the same people will be made at intervals of 1 or 2 years over a 12-year period to find out how their situation changes during retirement and the adjustments they make. The retirement experience of this group is expected to throw new light on the problems, interests, and capacities of older people generally.

The initial interviews, which will be conducted for the Social Security Administration by the Bureau of the Census, will cover the year before the interviewees apply for social security benefits so that the retirement histories can be developed from the beginning.

The study will seek the following information from the 3,000 persons:

- How many have sufficient income from their own resources, including old-age and survivors insurance.
- What they do if their financial resources become inadequate to meet their needs.
- How their chief items of expense change as they get older.
- What they do if they incur catastrophic medical costs.
- How long those who were financially independent at the start of their retirement remained so and under what circumstances they get support from their children, public assistance, or some other source.
- Their attitudes toward their retirement and its problems.
- What they think are their greatest unmet needs and how these affect their adjustment to old age and retirement.

A panel of experienced consultants conferred with the research staff of the Bureau of Old-Age and Survivors Insurance in working out the questionnaire and advised on technical problems. The consultants were Dr. Gordon Streib, professor of sociology, Cornell University; Dr. Ethel Shannas, National Opinion Research Center, University of Chicago; Miss Anne Geddes, Community Research Associates, Inc.; Dr. Nancy Bayley and Dr. Olive Westbrooke Quinn, National Institute of Mental Health, Public Health Service; and Dr. Oswald K. Sagen, Public Health Service.

Forecast of Dental Service Needs in the South

WALTER J. PELTON, D.D.S., M.S.P.H., and RUTH DEE BOTHWELL, B.A.

TO ERASE the difference between the ideal and the merely adequate in dental care is one of the greatest challenges in public health today. But since the ideal must wait upon the practical, we are concerned with the more realistic goal of providing the dentists the South will need to meet the actual demand for dental care.

This is not easy to do. State and regional boundaries are much more clearly defined on a map than they are in public health planning. The problem which the South faces in providing for the future dental health of its citizens is neither unique nor isolated. The dental manpower problem in Arizona is not only similar to that in Alabama, but the manner in which Arizona solves it will affect Alabama's answer too. A national shortage of dentists has developed—a shortage already limiting the amount of care which people who want it can get.

This shortage dates from the early 1920's, when improved standards of dental education resulted in the closing of substandard schools, and caused a sharp cut in enrollment. During the depression of the thirties, a further reduction occurred. By the time World War II began, there were fewer dentists than there were prior to 1930, only about half as many students were attending dental school as in the mid-twenties, and not enough new dentists were being produced to replace older dentists who had died or retired. When large numbers of dentists entered the service, the shortage was further aggravated.

Dr. Pelton is chief, and Miss Bothwell, public health research analyst, of the Division of Dental Resources, Public Health Service. *The paper was presented in substantially the same form before the American Public Health Association, Southern Branch Meeting, at Asheville, N. C., on May 31, 1957.*

Persons-per-Dentist Ratio

The years since the war have seen expansion in training capacity and a rise in new dentists entering the profession. By 1955, nearly 3,100 dentists were graduated from the Nation's schools—twice the number of the last prewar class of 1941. But the population has grown much more rapidly than has the supply of dentists. By 1955, the persons-per-dentist count had risen to 2,169 from 1,870 in 1940 and 1,728 in 1930. With our larger population of 1955, it would have taken nearly 19,000 more dentists than were then in practice to restore the 1930 ratio.

Ratios in every region of the country are less favorable than in 1930, and, for some States, less favorable than in 1920. The States most affected by this adverse trend are those with the greatest population gains. Georgia, Louisiana, South Carolina, Virginia, Delaware, Maryland, West Virginia, and Texas have continued to lose ground, with current ratios considerably less favorable than those of 1940 or 1930. In four of these States, the persons-per-dentist count is now higher than at any time in this century. In fact, the only State in the

South appreciably better off than it was in 1930 is Arkansas, and the only State which has succeeded in stabilizing the count at the 1930 level is Oklahoma. Both have been subject to heavy population losses due to migration. In the remaining Southern States, the 1955 persons-per-dentist counts are considerably better than the 1940 ratios, but are not at the 1930 standard.

The South as a whole, moreover, is still the least well supplied of any region, with only 1 dentist for every 3,572 southerners in mid-1955. This is almost two-thirds more than the number of persons served by the average practitioner in the United States (fig. 1). Florida, with nearly 2,500 persons per dentist, ranks first among the Southern States, but only 24th in the Nation. The remaining Southern States occupy 15 of the bottom 17 positions. At the end of the list is South Carolina with almost 6,000 persons per dentist, about 4 times the number served by the average dentist in one of the top-ranking States.

Although dentists are no more unevenly distributed in the South than in most regions of the country, maldistribution is especially serious because the overall supply of dentists is so limited. In the average metropolitan area, there is 1 dentist for every 2,200 persons. But in the smaller urban counties, there is only 1 for every 3,000 persons, and in counties with no city of 10,000 or more population, the average dentist serves nearly 4,700 persons. In some States, persons-per-dentist ratios in these less populous counties reach an average of nearly 7,000. In Georgia, 1 in every 4 counties is without a dentist.

Actually, more ground has been lost than is indicated by trends in persons-per-dentist ratios. Because so few dentists were added in the years before the war, we now have a large concentration of dentists in the older age groups. The proportion 55 years old and over about doubled between 1930 and 1950, and the proportion reaching 65 years of age nearly tripled. By 1950, about 1 in every 3 dentists in the South was at least 55 years old, and 1 in 9 had reached 65 years of age. As a result, nearly half of the 14,000 dentists now practicing in the South must be replaced by 1975. Among the Southern States, Delaware, Florida, Louisiana, Oklahoma, and West Virginia face the most serious replacement problems.

Factors Affecting Demand

These needs still represent only a fraction of the total number of dentists required in the future. The population is growing, incomes are climbing, and other changes are taking place to make dental care more accessible in the

Figure 1. Dentist-population ratios in the United States and in the South.

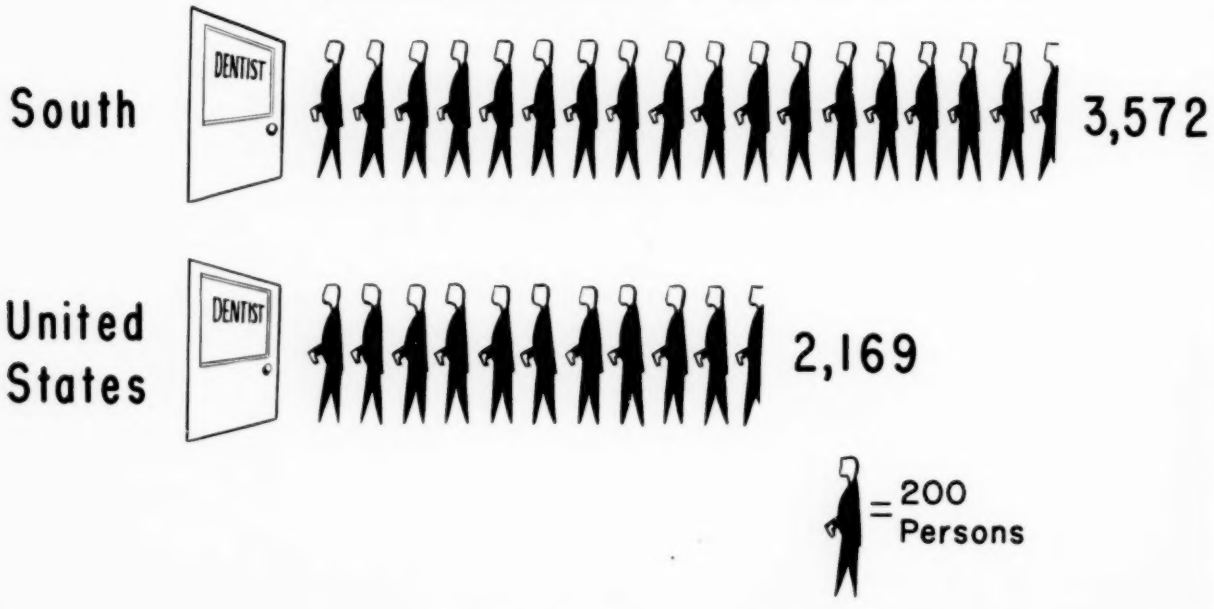
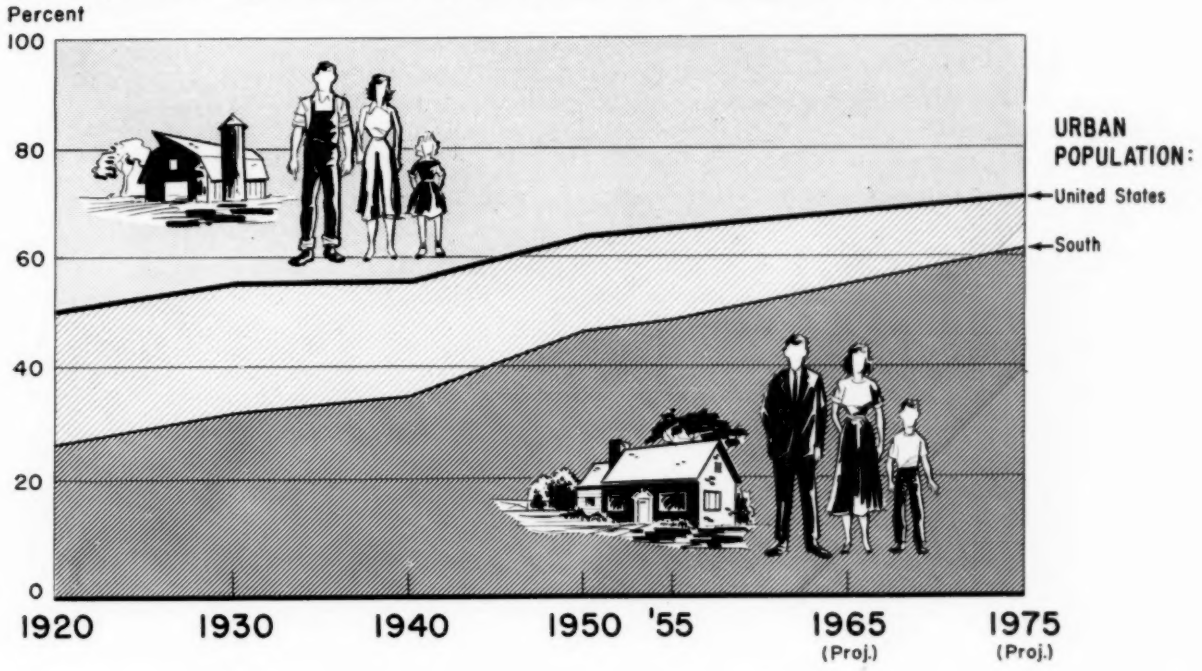


Figure 2. Proportion of urban population in the United States and in the South.



future and more likely to be sought than at present. The South, even though growing less rapidly than the rest of the country, has an annual increase in population of close to 680,000 persons a year compared with an average of 360,000 in the years before the war. Thus the equivalent of a new Dallas or a new Miami emerges full grown each year. Conservative population projections show that the South can expect to see about 640,000 persons added to its present population of about 50 million each year during the next 10 years, and then, in the following 10 years, when all the postwar "babies" start having children of their own, 825,000 a year will be added. By 1975 these figures will mean 15 million new potential consumers of dental services in the Southern States.

More important than growth, however, are changes taking place in the makeup of the population. We are, for example, rapidly becoming a nation of city dwellers. And city folk find it less inconvenient to visit dentists than do their country cousins. Moreover, city folk generally have jobs demanding a minimum standard of personal appearance and have greater cash incomes to pay for dental services. The South is still much less highly urbanized than are other regions, but it is rapidly catching up with the remainder of the country (fig. 2). In 1930, only 33 percent of all southerners lived in cities; 23 percent less than the national average. Now an estimated 49 percent are urbanites, and the difference between the South and the country as a whole is only 16 percentage points. By 1975, if the trend continues, the southern percentage will be within 9 points of the national average.

This change means that the rural population will shrink, and the 15 million new southern residents projected for 1975 will all have been added to the city population. As a result, instead of the 25 million urban residents of 1955, there will be 42 million in 1975, about 17 million more people living in towns and cities, subject to all the subtle influences that make urban residents the largest consumers of dental services. A good share—perhaps upwards of three-quarters of the net increase in the population during this period—will be registered by the big metropolitan areas, thus facilitating access to specialists' as well as generalists' services.

Education for the average southerner will also be greatly increased (fig. 3). We may assume that the percentage of southerners completing high school will rise until by 1975 it

reaches the level that in 1950 characterized the country as a whole. Approximately 28 percent of all southern adults between 25 and 65 years of age in 1950 had completed high school. But less than a fifth of those 45 years old or over had done so. These will be replaced by better educated youth. And, of course, the number of people reaching 25 years of age during the next 20 years will be very much larger than the number leaving this age group, so that 4 in every 5 people added to the adult population between 1950 and 1975 will have finished high school. Consequently, by 1975, the proportion of high school graduates within the total group will have advanced to 46 percent from only 28 percent in 1950. Probably an even greater proportional change will occur in those receiving college training.

This rise in education in the South will have far-reaching consequences: Adults in general and, more important, the parents among them are likely to have greater appreciation of the value of oral health than is the case today.

Significantly, the States most affected by new levels of education will be those in which these levels now lag most seriously: Mississippi, the Carolinas, Georgia, and Alabama. In States now at the top of the education scale, the number of high school graduates among the adult population will probably double by 1975, but more than triple in the low-ranking States.

The ways in which southerners make a living are also changing in a way that spells greater future demands for dental care. The trend is toward better paying occupations. Professional and technical workers, proprietors and managers of nonfarm businesses, and clerical and sales workers—the so-called white-collar groups—accounted for more than two-thirds of all employment expansion between 1940 and 1950, although they made up only one-fourth of the total work force in 1940. The number of clerical workers increased by about 80 percent, and the professional and managerial groups and the sales group by nearly 50 percent.

Skilled craftsmen showed the second largest

Figure 3. Current and expected portions of adult population with at least high school education, in each of the Southern States.

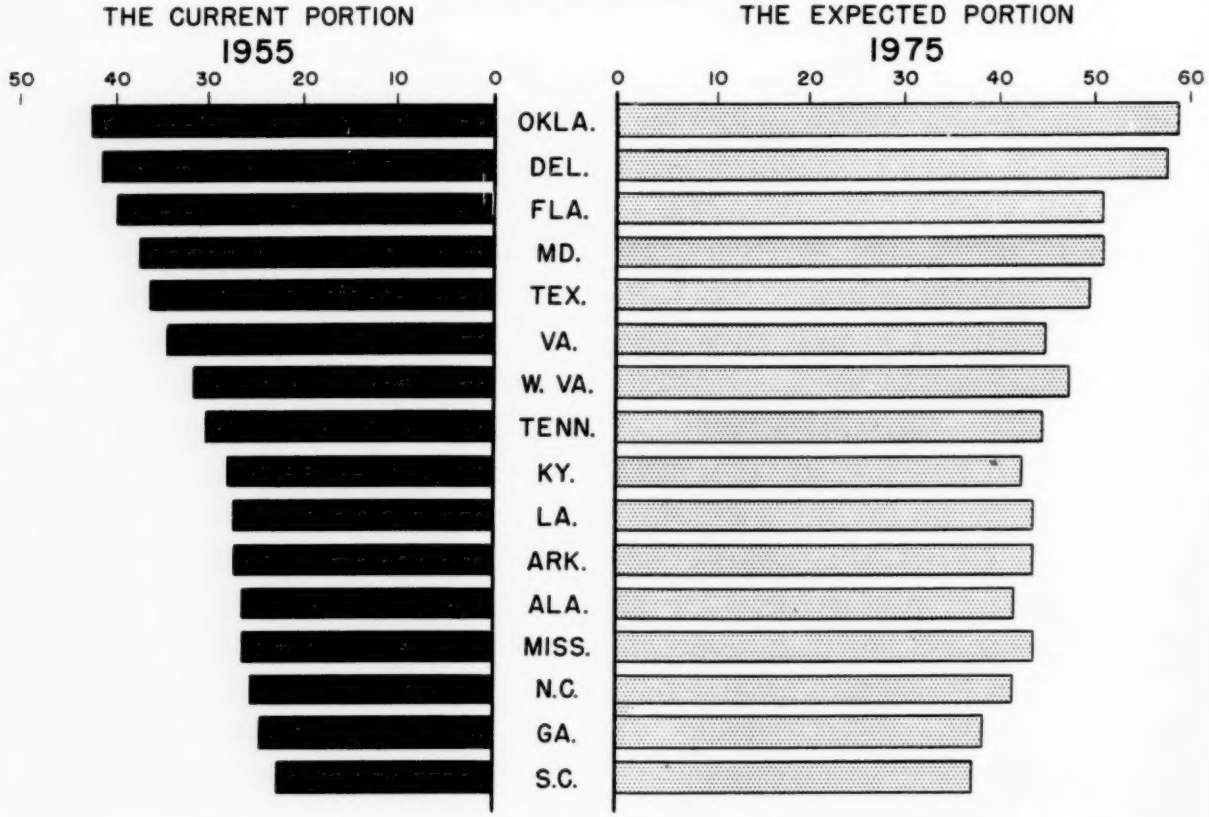
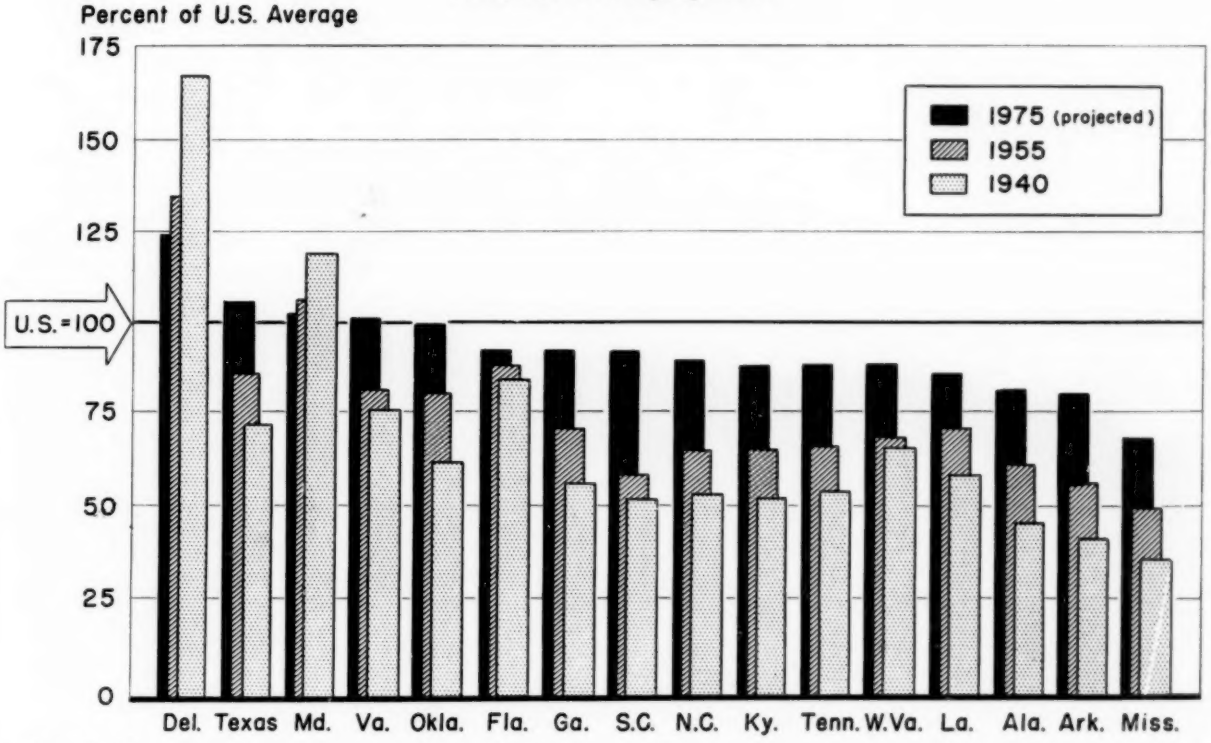


Figure 4. Average income in Southern States as percentage of United States average, for 1940, 1955, and 1975 (projected).



gain of all, increasing by more than 70 percent. The semiskilled occupations, on the other hand, registered a 50 percent increase, while the unskilled group gained but 11 percent. The farming occupations declined.

To a great extent these changes reflect a nationwide pattern. In the South they were far more pronounced during the 1940's than in the country as a whole. They mirror the gradual transformation of the region's economic character.

Southern industrial growth, both during and especially since the war, has been significant, although the region is still more dependent upon agriculture than are other sections of the country. The percentage of the Southern States' income from agriculture was cut in half between 1940 and 1955. At the same time, the percentage increase in southern manufacturing output (as measured by value added to raw materials by fabricating and processing) was a fifth larger than the national rate of increase for this period. Only Maryland, North Carolina, Virginia, and West Virginia failed to outpace the Nation during this period of phenomenal industrial growth.

The shifting economic base of the region has been important in improving the economic status of the average southern citizen, so that he is increasingly able to meet the costs of dental care.

A nationwide survey in 1953 by the Health Information Foundation showed that only 17 percent of the members of families with annual incomes of less than $2,000 had any dental care within a year, compared with 57 percent of those from families with $7,500 or more. Dental expenditures in excess of $45 for the year were reported by less than 10 percent of the low-income families, but by 40 percent of families with higher incomes.

Per capita income in the South has risen almost steadily ever since 1930, in absolute terms and as a percentage of the national average. In the last prosperous year before the depression, per capita income was only 59 percent of the national figure. By 1940, it had climbed to 64 percent and by 1955 to 76 percent. Projections of this trend indicate that by 1965 income in the South will be only 13 percent below the national average, and by 1975, but 4 percent.

When we apply this larger percentage for

1975 to an estimate of what income in the United States will be in 1975, the resulting change for the South is breathtaking. Parenthetically, this national figure is based on projections which already appear conservative. Expressed in 1955 dollars, average personal income in the Nation will rise from about $1,850 now to about $2,550 in 1975, an increase of about $700. Southern per capita income, however, will rise by $1,050, climbing from $1,400 to $2,450.

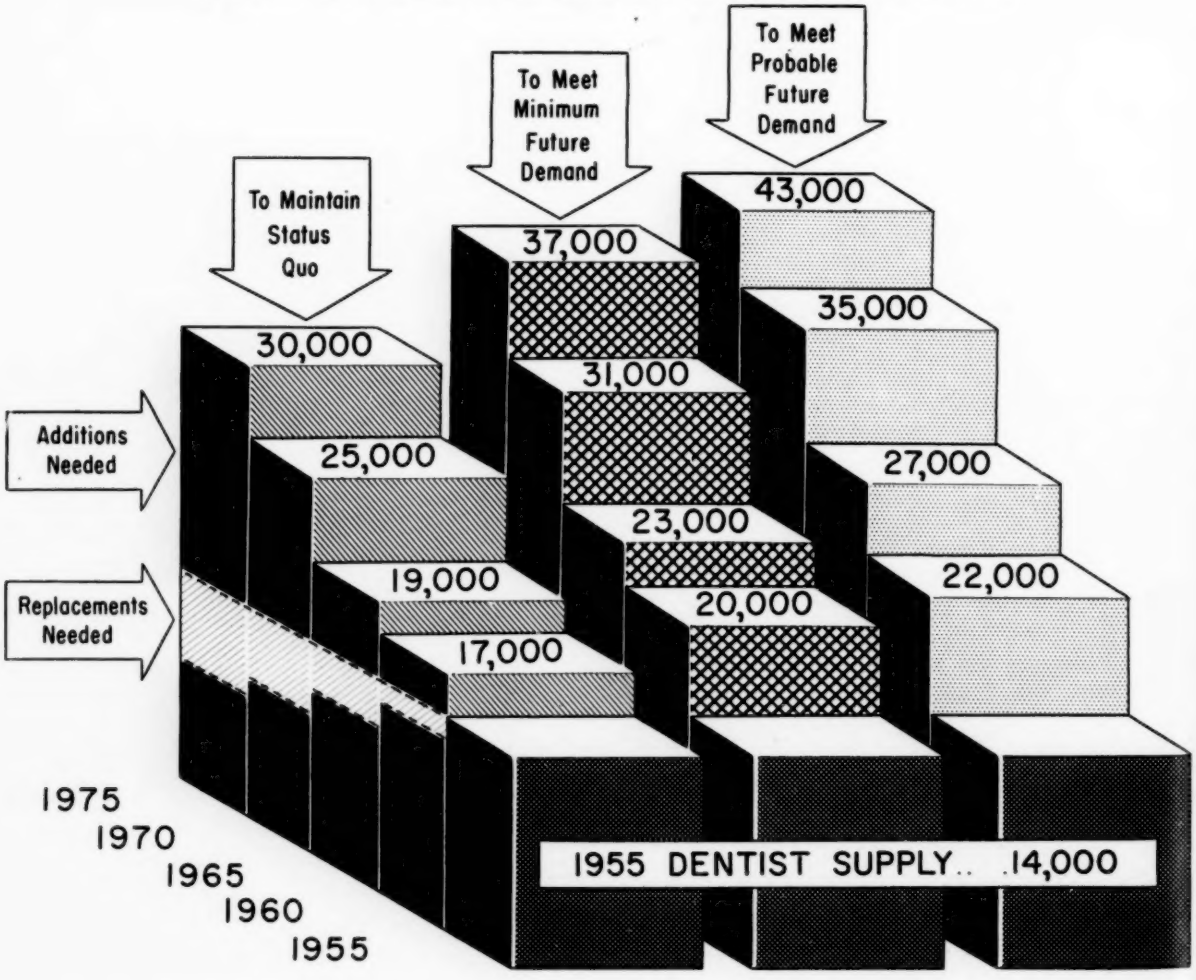
Where incomes are already above the national average, they will tend to drop as a percentage of the national figure. In most of the States, however, incomes will rise more rapidly than in the Nation and by 1975 will be a much higher percentage of the national total than they are today. By 1975, Delaware, Oklahoma, Maryland, Texas, and Virginia will have average incomes exceeding the national figure. South Carolina will make the greatest progress (fig. 4).

Future Manpower Needs

With per capita income going up to nearly twice its current level and the population growing by some 15 million, the total income available in the Southern States will increase enormously by 1975. If we assume that these States will spend no greater share of that future income on dentists' services than they do today, the South will need approximately 16,000 additional dentists by 1975.

Yet today the South has fewer dentists in relation to income than any other region, even after full allowance is made for low educational attainment and the large rural population. For

Figure 5. Current and projected need for dental services in the South.



this reason, it is realistic to assume that future demand will at least equal that of 1955 in the average State and will more probably approximate the average for the 24 top-ranking States, provided again that differences in education and urbanization are taken into account.

To increase the dentist supply in each Southern State sufficiently to meet the demand level existing in today's average State, nearly 23,000 additional dentists will be required by 1975.

However, to bring the dentist supply up to a level equivalent to the average among the 24 top-ranking States today, a level adequate for meeting probable demands for service, about 29,000 more dentists will be needed by 1975. Add to these figures the 7,000 necessary as replacements for those who die or retire and the results are staggering.

At every level of estimate, Texas, Florida, Virginia, and Maryland account for approximately half of the region's entire requirements. Delaware and South Carolina will have greater proportionate needs, however. In these States, additions and replacements needed by 1975 to meet probable service demands are equal to about four times their current dentist totals. Even Arkansas, Mississippi, Oklahoma, and West Virginia, with the smallest proportionate needs, will have to attract 1½ times as many dentists by 1975 as they have now.

Estimates of future supply prepared 2 years ago by the Division of Dental Resources, Public Health Service, indicate that the Southern States will fall seriously short of these goals. In spite of current and projected expansion in training capacity, it seems unlikely that the region can build up its dentist supply sufficiently even to maintain the status quo unless training facilities are substantially increased.

What the South can do to avert the acute shortage of manpower is now under study by the Southern Regional Education Board, set up and supported cooperatively by the Southern States to further education opportunities of their youth.

The manpower requirements presented here are really minimum requirements for attaining a standard of oral health that we already know to be far from satisfactory. Staggering as they may seem from a distance of 20 years, the estimates of future needs are only a fraction of the dental force necessary to provide the southern people with the care that they should have. As realists, we accept the lesser goal of meeting demands for dental care, but we must intensify our efforts to stimulate people to seek the care they need. In dentistry as in all health care, nothing less than the ideal can ever be adequate.

Course in Epidemiology for Nurses

Epidemiological principles, the role of the laboratory in epidemiology, and the application of practical statistical methods to the problems in field epidemiology will be studied in terms of current major communicable diseases from April 14 through May 2, 1958, at the Communicable Disease Center in Atlanta, Ga.

Those eligible for admission to the course are communicable disease nursing consultants, public health nursing supervisors, educational directors, qualified public health staff nurses, industrial nurses, instructors in schools of nursing, and other nurses having supervisory, teaching, or consultant functions.

Application forms and further information can be obtained from the Chief, Nursing Section, Epidemiology Branch, Communicable Disease Center, Public Health Service, 50 Seventh Street NE., Atlanta, Ga., or from the director of public health nursing of the State health departments. The closing date for acceptance of applications is March 17, 1958.

World Incidence Of Anthrax in Man

HAROLD N. GLASSMAN, Ph.D.

MAN and a wide spectrum of animal hosts are susceptible to anthrax. The disease is enzootic in many areas of the world, with concomitant contamination of the soil in those areas. The disease occurs in the economically important domestic animals—sheep, cattle, horses, goats, swine—and it is largely from contacts with these animals or with industrial raw materials derived from such animals (hair, hides, bristles) that man becomes infected.

Existing reviews of the extent of anthrax in man throughout the world (*1*, *2*) have definite limitations. The epidemiological monographs of Simmons and co-workers (*1*) make what are primarily qualitative references to the incidence of anthrax in a number of countries. A recent paper by Kaplan (*2*) which was presented at the Symposium on Anthrax in Man held at the University of Pennsylvania in 1954 reports quantitative statistical data on the incidence of this disease but restricts its attention to the years 1951–53. A better appreciation of the world distribution of anthrax in man can be obtained by consideration of epidemiological reports covering a longer period of time. This is true because a number of nations wherein anthrax has been prevalent in recent decades currently do not submit epidemiological statistics to the World Health Organization.

The incidence of human anthrax in a number of selected countries has been tabulated for the period 1924–53 (see table). The epidemiological data have been extracted from statistics published by the World Health Organization for the years 1939–53 (*3*), and by the Health Organization of the League of Nations for the years 1924–38 (*4*), and computed as average experience per year at 3-year intervals.

Dr. Glassman is assistant scientific director of the laboratories of the Army Chemical Corps at Fort Detrick, Frederick, Md.

The incidence of human anthrax is probably correlated with the enzootic status of the disease in the animal population of the country or, as in the United States, with the importation and industrial use of infected animal products. There is no necessary relationship between the population of a given country and the incidence of this disease. For example, the Cape Verde Islands, with a population of approximately 148,000, has had from 52 to 105 cases per year for the last 4 years for which statistics are available (1950–53). Other examples of comparatively small countries with a high incidence of human anthrax are Kenya with an experience of 200 to 1,000 cases per year in a population of approximately 6,000,000; and Portugal with an experience of 1,174 to 2,270 cases per year in a population of approximately 8,000,000.

Inspection of the table reveals that human anthrax is prevalent in Africa (French West Africa, Kenya, Ruanda-Urundi, Tanganyika), South America (Argentina, Chile, Uruguay, Venezuela), Europe (Bulgaria, Italy, Portugal, Rumania, Spain, Yugoslavia), the Near and Middle East (Iran, Iraq, Turkey), and Eurasia (U.S.S.R.). Only a few cases are being reported currently from North America and Oceania.

It is interesting to note that, in countries where the incidence of human anthrax is high and where statistics are available over a number of years, there is no evidence of any significant change in the incidence of anthrax over the 30-year period 1924–53.

There appear to be adequate reasons to conclude that the statistics of the international health organizations relative to the incidence in man of anthrax are understatements of the actual facts. Reasons for such a conclusion are:

1. Communicable diseases in general are under-reported. Among the factors that would be of particular importance in considering the completeness of the reporting of human anthrax would be the accuracy of diagnosis of this disease. It has also been suggested that in countries where the term "charbon" is used for both anthrax and carbuncles, inaccuracies in reporting may result.

2. This disease is prevalent in many coun-

tries which do not observe the most advanced public health practices (for example, various portions of Africa). Reports from such countries cannot be expected to represent the actual number of cases occurring.

3. Anthrax is not a notifiable disease in many countries where there are a priori reasons to believe it occurs with some frequency (for example, Afghanistan, Algeria, China, Czechoslovakia, French West Africa, and Iran).

4. A significant percentage of cases of human anthrax go unreported even in countries where public health standards are high and where notification of the disease is compulsory. For example, in the United States in fiscal year 1956, a total of 29 cases of human anthrax were reported to the National Office of Vital Statistics. The Epidemiology Branch of the Communicable Disease Center, Public Health Service, has found and obtained surveillance data on nine

Incidence of human anthrax in selected countries, 1924–53 [1]

Place	1951–53	1948–50	1945–47	1942–44	1939–41
Argentina	321				
Bulgaria			1, 525(46)	709(35)	624(40)
Cape Verde Islands	85(5)				
Chile	298(26)	359(40)	525(49)	715(84)	361(55)
French West Africa	[2] 324(95)	[3] 430(41)			
Greece	144	231	319	58	36
Hungary					
Iran			1, 524(27)	639(15)	2, 318(38)
Iraq	253(1)	157	132(1)	107	99(3)
Italy	1, 119(13)	1, 223	1, 710	826	787(85)
Kenya	807(27)	844(37)	597(30)	297(9)	214(13)
Portugal (mainland)	1, 384(13)	[3] 2, 270(35)			
Rumania			880(63)	674(48)	1, 089(67)
Ruanda-Urundi	451(7)	336(12)			
Spain	1, 078	1, 601(33)	(83)	(98)	(181)
Tanganyika	422(16)	203(8)	294(21)	97(10)	
Turkey	1, 555(30)	1, 405(44)	1, 421(91)	837(60)	748(52)
Uruguay	84	59	88	153	123
United States	51(2)	54(3)	50(5)	73(10)	80(8)
U.S.S.R					
Venezuela	126	235			
Yugoslavia	1, 105(26)	1, 108(32)			

Place	1936–38	1933–35	1930–32	1927–29	1924–26
Argentina					
Bulgaria	914(64)	1, 026(65)	856(75)	465(52)	
Cape Verde Islands					
Chile	289(86)	223(79)	(94)	(108)	
French West Africa					
Greece				(198)	8
Hungary			(47)	(64)	
Iran					
Iraq					
Italy	1, 128(138)	1, 278(151)	1, 653	2, 053	2, 288
Kenya	132	113	110	82	
Portugal (mainland)					
Rumania	2, 228(385)	1, 293(264)			
Ruanda-Urundi					
Spain					
Tanganyika					
Turkey	769(56)	566(40)	413(42)		
Uruguay			75(17)	79(10)	126
United States	65(10)	53(13)	67(23)	80(19)	137
U.S.S.R		2, 569	4, 542	15, 950	15, 435
Venezuela					
Yugoslavia	649(53)	744(75)			

[1] Number of cases are averages per year. Figures in parentheses represent number of deaths.
[2] Data represent 1951 only.
[3] Data represent 1950 only.

additional cases which apparently were unreported (Division Project No. 201–E–45).

5. Several countries which currently do not submit epidemiological statistics for inclusion in World Health Organization reports have, in reports published some time during the past 30 years, indicated that human anthrax occurs with some frequency within their borders (see entries for Bulgaria, Hungary, Rumania, and U.S.S.R. in table). The following countries did not submit data for inclusion in the most recent (1953) yearbook on epidemiological and vital statistics of the World Health Organization: Albania, Bulgaria, China (except Taiwan), Czechoslovakia, Hungary, Liberia, Poland, Rumania, Saudi Arabia, U.S.S.R., and Yemen.

The countries presently providing their statistics on the incidence of human anthrax to the World Health Organization report a total of approximately 9,000 cases per annum. When one reviews the statistical data from the League of Nations and the World Health Organization for the period 1924–53 (see table), and gives due consideration to the reported data understating the actual situation for the reasons outlined above, one can reasonably conclude that the incidence of human anthrax in the world in recent years has amounted to 20,000 to 100,000 cases per annum. Anthrax is thus seen to be a much more frequently occurring disease in man than one might conclude from considering only the experience in such countries as the United States. It is also worth reiterating here that the incidence of this disease in many parts of the world appears essentially constant for the years under review.

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(*2*) Kaplan, M. M.: A brief review of anthrax prevalence and epidemiology. *In* Proceedings of the symposium on anthrax in man. Philadelphia, 1954.

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Mental Health in Industry

Results of a survey of industrial mental health conducted by the National Institute of Mental Health, Public Health Service, at the request of the State and Territorial mental health authorities, have been compiled and issued under the title "A Review of Mental Health in Industry."

The review contains a summary of the recent literature, a bibliography of 150 titles dealing with psychiatry and mental health in industry, a description of representative mental health programs, and a list of films on human relations in industry. It also provides an overview of the medical aspects of industrial mental health.

The publication was prepared by the Institute's Community Services Branch, which furnishes technical assistance and consultation to the States in the conduct and development of their mental health programs.

Copies of A Review of Mental Health in Industry can be obtained by writing to the National Institute of Mental Health, Public Health Service, Bethesda 14, Md.

The State of the Nation's public health services

Abridged reports from the 56th Conference of the Surgeon General of the Public Health Service and the Chief of the Children's Bureau with the State and Territorial Health Officers, Mental Health Authorities, and Hospital and Medical Facilities Survey and Construction Authorities, November 3–8, 1957, Washington, D. C.

Building the Protective Wall

By Leroy E. Burney, M.D.
Surgeon General of the Public Health Service

The record of public health in the United States has been established in great part through the individual and collective efforts of State and Territorial health officers. That record is an enviable one. To be sure, the people are not always as gratefully aware as we would like them to be of the hidden services which form a wall of protection around their families and communities. Just as surely, we who are occupied full time in the practice of our specialty are sensitively aware of the gaps in that protective wall and the inadequacies of our resources. But, on balance, the informed but detached observer would be forced to the judgment that the public health system which covers the Nation has become a relatively efficient factor in the good life which this country enjoys.

Foreign visitors traveling now in the United States are much impressed with our home heating plants and washing machines, even with our mail order catalogs. I am positive that they are impressed, too, with the high degree of health protection which our people accept so casually in their communities and as they travel from State to State.

My appreciation, however, comes equally from the assurance conferred by experience that this same Federal-State cooperative approach and this same sharing of the load will continue to be the American way of seeking

better solutions for unsolved health problems and rational approaches to new problems.

A current example is the influenza vaccination program. From first alert to full-fledged operation has taken an amazingly few months. The manufacturers produced by December 1 more than 60 million cubic centimeters of Asian influenza vaccine—a good 2 months ahead of original estimates. Equally outstanding is the efficiency of our nationwide communications system and the competence of our specialists in public information and health education, which have made the American people active participants in a truly national effort.

There are many imperfections in the influenza vaccination program, as inevitably there will be in such large-scale operations. But preventive medicine has kept better step with the natural forces of an epidemic in this instance than it has ever been able to do in the past. At no time was it claimed that we could stave off the epidemic from this country. Nor was it claimed that the program was initiated in the guise of a defense against mortal illness. But we are just now beginning to see the more serious attacks occurring in older age groups and other high-risk groups which show a higher mortality rate. As the vaccine now becomes more generally available, let us intensify our efforts to see that as many individuals as possible have the benefit of vaccine protection.

It seems axiomatic in the health officer's existence that he has never finished one urgent task before at least one more demands his attention. While we have been preoccupied with influenza, we dare not forget the partially won victory against poliomyelitis. An effective vaccine is available in adequate supply. Its use to date has produced remarkable reductions in paralytic poliomyelitis. But we cannot close this chapter until we know that the 80 million unvaccinated and partially vaccinated persons under 40 years of age have received protection before the next high-incidence season.

On still another front, we are faced with a host of problems each of first magnitude. Growing populations, finite natural resources, technological changes in industrial production and daily living—all confront us with self-made threats to health and life, comparable to those previously offered by microbial hazards. Those who are surrounded by these problems need scarcely be reminded of the flat necessity of moving forward in water and air pollution control and, most emphatically, in radiation protection.

We have so much to learn in the realms of biophysics and biochemistry that we need expect no quick and simple answers to these questions. But by hard, unremitting toil, we must learn more of the toxic effects on man—in long-continued, low-concentration exposures—of the many physical and chemical forces to which he is now exposed. We must also have increasing precision in the measurement and analysis of the physical and chemical components themselves so that we can define and evaluate existing exposures accurately.

From increasing biological and technical knowledge will come eventually standards of safety to which all can subscribe. And we must put the same intelligence which is producing man's new environment to work in devising the means to hold those standards. Meanwhile, we must do whatever we can to reduce excessive concentrations harmful to man's health and safety. For while we recognize the necessity and the values of new factors in modern life, they must be kept in balance if man is to realize his ambition to continue to exist in reasonable health and happiness.

We have made some progress toward this objective in nationwide programs to cope with water and air pollution. Public health, however, has not yet taken its proper place in radiation protection. The increasing medical and industrial uses of fissionable materials place this responsibility in the realm of community health protection, since these major sources of exposure are the common experiences of life and work, rather than the extraordinary and occasional experiences related to military operations.

As I look through the agenda for this conference, I find some old familiar items. But a comparison of topics year by year very surely shows us the trends of our concern.

We will be discussing the topics I have already touched upon. We will be concentrating even more vigorously on training activities.

We will add improving steps to things we have done before.

An example of the latter is the improvement of working relationships in the field of records and statistics. I note with considerable satisfaction the report of the Joint Committee on Vital Records and Health Statistics which offers solutions to certain problems in the maintenance of comparable data and uniform records in our national and State programs.

Finally, we will be discussing with greater emphasis the problems of chronic disease control and health of the aging. This year grant-in-aid funds have been made available to help surmount some of the financial barriers that inevitably block the development of new and unfamiliar projects. The reports we have received from the States on their plans for the use of these funds are encouraging. They indicate a real beginning toward the comprehensive, balanced programs that will not only attack the major causes of disability, but also will make life healthier, happier, and more meaningful for millions of our older citizens.

Public health must take the lead in changing that intolerable and unnecessary situation of having tens of thousands of persons in the richest nation of the world deprived of the very high quality preventive and rehabilitative services which it is now possible to provide. I am pleased to see that you are taking up this challenge by devoting a considerable portion of your agenda to nursing home operations and other equally practical and down-to-earth aspects of this problem.

Very crucial to the development of better services for the chronically ill and to all of the newer programs that concern us is the question of how to organize them within our existing community structure.

There is always a greater lag between a new concept involving human relationships and its support by the public than between the discovery of a "miracle drug" and public acceptance. How then do we modernize our public health structure at the point where it counts most—the local health agency? We are fortunate indeed at this conference to be able to draw upon the personal experiences of local health officials who have successfully answered that question. Those of us in Federal and State agencies have much to learn from local officials, who are at the delivery point of public health services.

As always, the plans we make together will affect the lives and welfare of all our people. But now we must plan in a setting, on the one hand, of greater and greater demand for vast expenditures for military defense and world security, and, on the other hand, of a growing realization that there must be some reasonable limitation on taxation and government spending.

We work as usual within these constricting factors. We will feel them even more within the next few years. But we can never forget our responsibility to keep the Nation aware that its defense, its security, its hopes for world peace depend primarily upon a healthy and vigorous people protected in their homes, schools, workplaces, and communities by health services sufficient unto the day of a new and changing world. We know that without the work of the Nation's health agencies there will be less to defend and less with which to do it. From this inner conviction we must draw the strength that keeps us to our tasks.

Grants-In-Aid Reappraised

By John A. Perkins
Under Secretary of Health, Education, and Welfare

My remarks are concerned with a fundamental problem of American government that has been much debated since the days of Hamilton and Jefferson. In 1908, Woodrow Wilson declared the question of the relationship of the States to the Federal Government to be the "cardinal question of our constitutional system." It still is.

Public health is where it is today owing in large part to the evolution of the Federal-State relationship in the last 30 years. The new Federal-State relationship, heralded in the 1930's as the "new federalism," was brought about largely through the grant-in-aid device.

There were definite weaknesses among the States that these grants—matching, stimulatory, and other varieties—were initiated to overcome. The complexities of 20th century urban life seemed to require legislative and administrative action with respect to public health, safety, and welfare. These areas of public activity were not delegated to the Federal Government. They were reserved to the States.

A few commonwealths, generally the wealthier ones, did enter upon social legislation, regulation, costly research, and other concomitants of modern government. In these States, industry and citizens found some of their individual and corporate freedom reduced in order to promote the health, safety, and welfare of the people as a whole.

Industry and citizens either sought sanctuary, or threatened to do so, in other States which had fewer regulations and lower taxes. In the poorer States modern services could be financed only with the greatest difficulty, if at all. Capacity to tax in support of such governmental services varied greatly from State to State. Even where there was the wealth and a fairly satisfactory revenue system, the legislature did not always understand the wishes or requirements of the people. Many of the legislatures were not really representative because they were not properly reapportioned as State population patterns changed. They did not, and sometimes still do not, reflect the predominantly urban culture that has developed in the United States.

Then, too, in many commonwealths, executive authority has been diffused among the governor and a host of other elective State officials. Fixing responsibility for initiation of executive policy—or the failure to initiate it—has been difficult. It became increasingly evident that the extent and quality of some services of government, such as fighting disease and safeguarding public health, while local by fact of original Federal-State arrangement, were national in their consequences. The Federal Government had to act.

Grants-in-aid to the States administered by the Public Health Service were first introduced in 1918. This first grant, which was for venereal disease control, gradually dwindled to nothing by 1926. Grants were not reinstituted for public health services until 1935 with the passage of the Social Security Act. Title VI of that act, administered by the Public Health Service, provided for general health grants. To this authority were added venereal disease control grants in 1938, and with the codification of Public Health Service legislation into the Public Health Service Act of 1944, tuberculosis control grants were authorized.

The year 1936 was historically significant for expansion of health and welfare services for children. The Children's Bureau, which from 1921 to 1929 had administered funds for maternal and infant health, was enabled under the Social Security Act to aid the States in greatly improving and extending services for maternal and child health, crippled children, and child welfare.

Subsequently, mental health and hospital survey and construction grant authority emerged in 1946, and heart disease control and water pollution control grants in 1948. In addition, annual appropriation language beginning in 1948 provided the basis for grants in cancer control and in 1949 for a special public health grant to the Territory of Alaska.

Grants for the construction of hospitals were extended in 1954 to other types of medical facilities. In 1955 came Salk vaccine; funds were made available to the States through the special poliomyelitis vaccination assistance program. In 1956 grants were made available to strengthen State and interstate water pollution control programs and to assist municipalities in the construction of waste treatment works. Also in 1956 grants were approved for a national mental health study, for vocational training of practical nurses, for further professional training of graduate nurses, and for a public health traineeship program. In 1957 Guam was made eligible for Public Health Service grants, and special grants were made for projects for mentally retarded children.

Every State now has a mental health program. In 1946, which was a year before the Federal Government started making grants-in-aid to States for mental health services, such programs were in formal existence in only seven States.

The Hill-Burton program has stimulated a

substantial volume of needed hospital construction, especially in low income rural areas. This Federal assistance to local hospitals has brought about improvement in standards of design and has indirectly improved standards of operation, through encouragement of State licensure. Federal support of specialized health programs has brought great benefits to the American people.

In the evolution of these grant programs, however, certain disadvantages have become apparent:

First, the grant process has so improved those functions of government which are of immediate interest and concern to the individual that people generally have felt little or no need to insist on correction of the weaknesses in the organization of State and local governments that helped to give rise to Federal intervention in the first place.

Second, the people most directly affected have, to a certain degree at least, been removed from the process of decision making.

Third, the grant process makes it difficult to relate the tax bill to the services received. Federal expenditures, expanded as they are by large outlays for defense, come to seem unconscionably high to taxpayers. Unfortunately, the taxpayer is not aware that much of the service he is receiving at the State and local levels depends to a considerable extent on the Federal tax he pays. If State and local taxes paid the whole bill for the services received on the State and local levels, the taxpayer could readily decide whether the services were worth the cost.

Fourth, the responsible expenditure of any public money requires certain safeguards to make sure that the money is expended prudently for the purpose for which it was provided. In carrying out this responsibility, Federal officials frequently encounter complaints that such safeguards constitute an intrusion into State and local affairs.

Fifth, one of the great advantages the Federal system of government offers has tended to atrophy. I believe it was Justice Oliver Wendell Holmes who spoke enthusiastically of the opportunities our Federal system affords for State governments to serve as laboratories where experiments in government might be made. State officials have been so busy carrying out the many programs initiated at the national level that there has not been enough time for inventiveness and special adaptations to local requirements on State initiative.

Sixth, State budgets have been somewhat distorted by the matching process. There is a natural tendency in the State budget offices and State legislatures to finance those activities for which the Federal Government puts up part of the money. The maximum Federal dollars are usually sought whether or not there is sufficient money left to finance the functions wholly dependent upon the State and local governments.

These are some of the specific problems in the grant mechanism. There is a related phenomenon. Grants originated to stimulate a particular program have a strong tendency to become frozen into the pattern of State budgeting. The Federal Government may believe that one grant program has served its stimulatory purpose. It senses another area where greater activity is needed in the national interest. The logical thing in that case would be to drop or greatly reduce the first grant program, leaving the remainder of the job to State and local authorities. The Federal money thus freed could then go into the new activity needing attention. But it is not quite that simple. There is a danger that when Federal money is withdrawn the States will not make up the difference.

In addition to these basic questions, there are now other circumstances that suggest reevaluation of the grant system. Sums required to maintain our military strength and that of our allies constitute a large burden on the national budget. A great many of the special taxes levied during the war are still with us. Those who would have bigger, better, and more grant-in-aid programs cannot with very good logic also demand that the Federal Government slash taxes and surrender tax sources to the States.

If State and local government is to be made as strong as all seemingly would have it, two things must be done. First, State and local administrators of government must be alert to emerging problems. In the field of public health, this means facing and solving such prob-

lems as those of the chronic diseases, the hazards of radiation, and economics of medical care, to name a few.

Second, we must so educate and inform our citizens on the importance of progress in public health that they will not be satisfied with anything less than the best programs possible. Here in the support of the citizen-taxpayer lies the secret of how to build sound and progressive public health programs. It is to your credit and that of State and local appropriating authorities that State and local funds for public health have been increased an average of 47 percent in the last 5 years. Some States have increased appropriations more than 100 percent in this period. In fact, State and local expenditures for public health, not counting maternal and child health programs, have increased from 74 percent of the total to 93 percent of the total since 1940. This record of what has been done in the past portends well for what can be done in the future.

I want to make it crystal clear that I am not calling for abandonment of the grant-in-aid device. There is, of course, a strong national interest in public health. Federal grants-in-aid have proved to be an effective means for furthering that interest and for smoothing out, at least on a minimum basis, the variations in wealth among the States. However, I am suggesting that realities of today's world and its demands on the Federal budget require that the States and local communities assume an increasingly greater part of both the burden and the challenge presented by the public health needs of the future.

Children in a Changing World

By Katherine Brownell Oettinger
Chief, Children's Bureau

A number of factors now influencing our national life and economy call for a great deal of vision and adaptability in the future direction of the Children's Bureau programs.

A demographic factor with particular significance is the sharp and continuing rise in our young population. This increase in the number of children is already taxing our services, most evidently in the schools, but also in the areas of health and welfare. Obviously, health and welfare services must be expanded to match this population increase even quantitatively. It is of particular concern to us because for this age group so much of the work is preventive in nature.

The rising cost of medical and hospital care—indeed, the rising cost for providing most of the services which are our concern—call for a high degree of administrative ingenuity in all our programs. In my opinion, such ingenuity must always be coupled with a program to promote understanding of the importance of the services we, as health and welfare workers, are giving.

We are indeed in an era where we must all run very fast to stay in the same place, and yet I know how dedicated you are to the principle of progress, of steadily building on the basis of new program concepts, of putting new knowledge to work as it becomes available.

I can think of no more vivid example of the States' desire to make progress than the way they have responded to the impetus of a small amount of special project Federal money to develop community programs for retarded children. As of now, 28 States are receiving these special project grants, and plans for 3 more States are in the process of approval. The grants for these 31 State projects total $1,338,530 for the current fiscal year. In addition, five other States are financing mental retardation programs with regularly apportioned Federal maternal and child health funds and State and local matching funds.

This speaks eloquently for your inventiveness and experience in the development of maternal and child health demonstrations. That it was accomplished within the space of 1 year in the face of recruitment difficulties and our lack of experience with clinical services for mentally retarded children adds to the stature of your achievement.

We all know that parents of retarded children have been the primary moving force in developments in the field of mental retardation. Parents are always a strong force in a democracy, and they represent a group to which

the Children's Bureau is responsive. The impetus to these developments presents fresh evidence of the contribution which citizens can make. This is one more chance that traditionally comes to the Bureau to put democracy to work.

Developments in the field of mental retardation are again proving the validity of the "team" approach in children's services. In these services, a number of States have developed effective working relationships among departments of health, education, and welfare, and involving parent groups as well. Of particular interest to us also, in connection with these project grants, are those projects now being carried out by medical schools in which practicing physicians, medical students, and nurses are gaining working knowledge about mental retardation. Our future medical graduates will have a much better understanding of retardation than generally exists at present.

In these few months in the Children's Bureau I have been impressed by the vast impact which the three categories of grants the Bureau administers—in maternal and child health, crippled children's services, and child welfare services—have had on the development of services for children in many States and localities.

Through the administration of its grants programs, the work of its regional offices, and annual conferences such as this, the Children's Bureau can stay constantly aware of changing conditions in State and local health and welfare programs to which it must be sensitive if it is to be responsive to the needs of mothers and children.

Trends in Child Health

We are all heartened by the emergence of a broad concept of rehabilitation in health, education, and welfare agencies. I speak now of rehabilitation as "making the best with what one has." This concept involves optimum social, emotional, and physical restoration, as well as the prevention of progression of disability.

One example of this trend is the increased interest in programs of service to child amputees. At the area amputee center at Grand Rapids, Mich., for instance, the project staff are making possible the rehabilitation of extremely handicapped children, with results which so far have been notable. As you know, the services of this clinic are available to a child amputee needing such specialized services from any State.

A cooperative venture on the part of the University of California at Los Angeles, the California State Department of Health, and the National Research Council, aided by a grant from the Children's Bureau, has made possible the child amputee research project at the University of California at Los Angeles. Here, particular attention is being given to the technical aspects of fitting children who are amputees, as well as to the psychological and social aspects. They are asking such questions as: How do children respond to prostheses? When should a child be fitted for a prosthesis? What is the best way for him to learn to use it? How does the congenital absence of an arm affect his growth and development? What defense mechanisms do parents develop to gain better acceptance of the prosthesis by both child and parent?

Incidentally, the Children's Bureau was able for the first time in 1957 to gather some information on the prevalence of amputations among children. On the basis of reports submitted by crippled children's agencies in 25 States, it would appear that about 1 percent of all children served in those programs lacked one or more limbs or parts of extremities.

We also see a trend away from long-term hospitalization for the child, and toward helping the family in providing care in the home. This trend in medical care programs is paralleled by a trend in child welfare programs which places increased emphasis on helping children in the setting of their own families, wherever this is practicable.

In the tremendous increase in hospital deliveries we are finding both problems and opportunities. The problems seem to center around the quality and quantity of available medical care: problems which may be accentuated in the light of our increasing birth rate.

But in the increasing interest in classes for expectant parents, evidenced all over the country, we have an opportunity to lay the groundwork for the promotion of mental health in families.

Information from the first revised maternal and child health report now coming into the Bureau shows that the increase in the number

of mothers and children receiving service under these programs continues. Three facts stand out:

- Some 10½ million children received the Salk vaccine under maternal and child health programs in 1956.
- Last year 2½ million children received audiometric testing. This is the first time we have information on the number of children tested under these programs.
- Some 296,000 children received medical services last year under the crippled children's program, an increase of 6 percent from the previous year. Congenital malformations continue to make up the largest group of diagnoses, representing almost a fourth of the total.

Last month, a group of radiologists, obstetricians, pediatricians, dentists, and public health workers met with the Bureau to advise with us on radiation hazards to mothers and children. Both this Association of State and Territorial Health Officers and the Association of Maternal and Child Health and Crippled Children's Directors were represented. The pediatricians and obstetricians attending this meeting reported that doctors in practice and in medical schools recognize the need to take positive steps to make sure that in its very proper role as a diagnostic tool, there is no excessive use of X-ray.

It seems equally important for us to examine our own practice in our clinics to be sure that routine does not become a larger consideration than the exercise of the physician's best clinical judgment in the use of X-ray.

Now, as to some of our related interests in which medical professional groups are devoting increasing attention:

For the eighth consecutive year, reports show a rise in juvenile delinquency which, percentagewise, is faster than the increase in the juvenile population. Interest in State and local programs for the control and treatment of juvenile delinquency continues at a high level. Several States have established new services, and a number have either proposed or passed legislation which provides for changes in State structure to permit establishing separate agencies or divisions to administer services to delinquent children.

There is also considerable activity in the establishment of new or reactivation of old State and local committees or commissions for communication, joint planning, and coordination of services and activities in relation to juvenile delinquency. Forestry camps have already been established in at least 10 States, with 5 others planning to establish such camps.

Maternal and child health services can be a strategic point for preventive efforts in juvenile delinquency. Studies show that some children at the ages of 9 or 10 manifest pre-delinquent behavior which could be noted in a good school health program.

As Norman Lourie has said, "We are aware that the so-called delinquent youngster . . . must have been deprived of something terribly important to him as a human being if, in order to be at peace with himself, he has to be at war with society." Strengthening family relationships during the earliest stages of the child's development could perhaps do much to offset this kind of deprivation. Well-baby clinics offer the natural setting for the discussion and strengthening of the developing mother-child relationship.

We must recognize that, among the young in our population, the adolescent is a neglected figure from a health standpoint. We have concentrated our concern for children on infants and very young children, and much useful knowledge has been developed for them which is in effective use.

It seems to me that we must increasingly adapt our health programs to take into consideration the concerns of adolescent youth which are not similar to those of younger children, and are not yet adult concerns. Adolescents have characteristics peculiar to themselves.

We need to give thought to how we are caring for adolescents in our hospitals, and whether the guidance clinics which are available to meet their anxieties, both real and fantasied, are truly responsive to their needs.

In our school health programs, we need to assure the adolescent adequate counseling on health problems rather than relegate the student's contact with that service solely to an examination for athletic participation.

In many instances, the problem of obesity in adolescence is being treated as a part of the

young boy or girl's "growing pains," when, in reality, it may be the starting point for a life pattern which can best be checked when first observed.

It is unfortunate that so much of the attention we direct toward the adolescent age group today is in the form of concern for those adolescents who are delinquent. I think we need to be concerned with adolescents as an age group with health and psychological problems, problems of finding their way in the world.

One of the greatest challenges we face today is helping teen-agers find their place in this changing world. I have implicit faith in the parents of this country, who are trying to do a good job in preparing their children for tomorrow's world. I am sure they will welcome any assistance that we in the helping professions can give them in making that preparation adequate for the testing days ahead.

Trends in Child Welfare

In child welfare programs, points of view are changing and experimentation is taking place in the use of foster care. Specialized foster family homes are being tried for children formerly believed to require institutional care. The present trend in institutional care is away from large institutions for neglected and dependent children and toward small group homes to meet special needs of emotionally disturbed children and of adolescents who are not able to assume closer foster family ties.

The Children's Bureau for the past 2 years has employed a special consultant concentrating on unprotected adoptions. Any examination of the reason for these adoptions—black market sale of babies, gray market or other independent placements—points to the lack of adequate care for unmarried mothers. This lack seems more acute since the rate of illegitimate births is steadily rising and the mothers are increasingly younger. A large number are only 14 or 15 years old.

In 1957 and 1958, our special consultant has been working to find ways to bring doctors, lawyers, and social workers together, in planning for more adequate services for unmarried mothers and in identifying the respective roles of these professions in adoptive placement.

Work on the statement on the role of the social worker in adoption is well under way.

A statement of the doctor's role, adequately publicized by medical groups, could be an enormous help in clarifying the attitude and the activities of physicians who place babies today.

We plan to seek the help also of lawyers in developing the third part of this total picture of professional services in adoption.

The Children's Bureau has long had an active interest in homemaker service as a way of maintaining family living in times of crisis. As the result of a meeting called by the Children's Bureau in June 1956 persons interested in homemaker service recommended that a conference be held this year.

However, interest in this service is so great, and it has such wide application to problems such as care of the aged and chronically ill, as well as to children, that our original plans have expanded to include other governmental agencies and many national voluntary and public health and welfare organizations. The anticipated conference will be on homemaker and related services.

Working on planning for this conference is a steering committee with membership from the Children's Bureau, Bureau of Public Assistance, Bureau of Old-Age and Survivors Insurance, Office of Vocational Rehabilitation, Office of Education, and Public Health Service. The conference is now planned for late in 1958.

The problems of migrants continue to cause us concern. All of us in the Federal Government wish we had more facts, rather than guesses—just such simple things as counts on the number who migrate, on the number of children who go along, whether or not they get into school, are immunized, and get needed social services. The special projects in Colorado and Florida have flourished and must be a source of pride to the health personnel. We are especially encouraged by the initiative that the New York regional office of this Department has shown in getting people from States in the region together on a regular basis to exchange knowledge on activities and ideas. Plans are now under way, we understand, for a joint meeting between Region II and Region III to exchange views on common problems.

Dr. Eliot has always reported to you on the work of the United Nation's Children's Fund. In September, I had the privilege of serving as principal adviser on the United States delegation to the Executive Board of the United Nations Children's Fund, and of seeing Dr. Eliot in action. The tributes paid her at this final session after her long years of devoted service show how greatly she will be missed as the United States representative.

At the September session of the board, allocations of $12 million were made to 80 projects in 53 countries or territories, bringing the total allocation for all purposes for 1957 to more than $24 million. Disease control is the largest area of expenditure, with malaria at the top with $8 million.

In recognition of the tradition of services of a high quality which have always distinguished the programs carried forward through the joint efforts of the Bureau and the State health departments, I hope in the years ahead we can continue to move forward with vigor in our role of helping the disadvantaged, of pressing for preventive measures, in continuing to enlighten the public in times which are constantly changing.

Social Security And Public Health

By W. L. Mitchell
Acting Commissioner
Social Security Administration

The Social Security Administration has been given jobs to do through congressional action that have important public health implications. As illustrative of the extent to which the Social Security Administration is already involved in health programs, approximately $370 million was identifiable in 1956 as public assistance expenditures for medical care. Almost $10 billion was paid out under our social security program, an aggregate that can be said to have public health implications if for no other reason than that personal well-being is inseparable from public health.

Payments under the old-age, survivors, and disability program are now at an annual rate of close to $7 billion, and the number of beneficiaries has passed the 10.5 million mark. About 5.3 million people are receiving assistance totaling some $2.8 billion a year under the four federally aided programs.

We in the Social Security Administration have been increasingly concerned about the interrelation of the service and income-maintenance aspects of our programs, and we share that concern with people in public health. Last year's amendments strengthened the welfare service aspects of the public assistance programs and helped the States to increase their medical programs. The effectiveness of the insurance program in meeting basic economic needs depends in many ways on the extent to which the community provides needed health, welfare, and related services, especially those which increase an individual's capacity for self-help and self-care. If the beneficiary is able to manage without major expenditures for special care, his benefit can more adequately cover basic costs of food, clothing, and shelter.

Since economic well-being is inseparable from social well-being, and since the dividing line between peace of mind and physical health is slight indeed, these programs cannot help but have tremendous impact on the health of all our people.

New Developments

Last year, Congress amended the old-age and survivors insurance program to provide cash benefits for severely disabled insured workers between the ages of 50 and 65. Earlier, in 1954, provisions had been enacted to freeze the benefit rights of workers who are totally disabled for long periods during their normal working lifetime. Well over half a million freeze applications have already been received. With cash benefits first payable for July 1957, it is estimated that about a quarter of a million persons aged 50–64 will be awarded benefits in the first year of operation. Disability benefits to be paid in calendar year 1958 are estimated at about one-quarter billion dollars. These benefits are paid out of a separate trust fund financed through a tax increase on employees, employers, and the self-employed.

To qualify for disability insurance benefits or for a disability freeze, it must be established that the insured worker has a physical or mental impairment that is so severe it keeps him from engaging in any substantial gainful activity. It must be the kind of physical or mental condition that shows up in the medical evidence, including the doctor's report, hospital reports, or special tests, and it must have lasted for at least 6 months and be expected to continue for a long and indefinite time.

The determination of disability is made by a State agency, usually the vocational rehabilitation agency, under an agreement between that agency and the Federal Government. The State agency staff, a medical consultant, and a lay adjudicator, usually with rehabilitation experience, make the determination on the basis of medical evidence and such personal and vocational factors as age, education, and work experience.

Health officers may be interested in some statistics from the operations of the disability provisions of the program. Of the cases adjudicated for benefits or a freeze in 1956, 85 percent were male. The median age of allowed applicants was 58.1 years and almost 65 percent were ages 50–64. In half the cases, the disabling illness had lasted 4 years or longer. Of all applicants allowed during 1956, 57 percent were in institutions or confined to their homes, and an additional 6.5 percent required help to get about outside their homes. These figures reflect the early adoption of procedures to identify severely disabled people. Institutional and home-bound cases were quickly identified and, as a result, were filed promptly.

Four classes of diseases accounted for more than three-quarters of the cases allowed in 1956: diseases of the circulatory system, including heart disease, about one-fourth; diseases of the nervous system and sense organs, about one-fourth; mental, psychosomatic, and personality disorders, about one-fifth; infectious and parasitic diseases, including tuberculosis, about one-eighth.

Through the 1956 amendments, Congress also extended benefits to the disabled child over 18 of a retired or deceased insured worker, provided the child had been totally disabled before age 18. It is estimated that about 35,000 disabled children will be added to the benefit rolls in the first year. A surprising number of these children had been disabled for many years and were completely unknown to the community. In some cases, the filing of a claim for benefits may be the means of making the parent or guardian aware that resources are available to help this child to a more normal life. Thus the new benefit has significance beyond the mere provision of income support for adult children whose disabilities make them dependent.

Physicians and Disability Provisions

A practicing physician, serving on a part-time basis, is frequently the medical member of the State agency evaluation team that makes the determination of disability.

The family doctor who has attended the claimant is also closely involved. The disabled person, applying at his social security office for benefits or to have his record frozen, is responsible for getting the medical evidence needed to show the extent and duration of his impairment. Most of these individuals have had some medical attention and will ask their attending physicians to supply medical reports on their conditions. Others may take the report form to the clinic, hospital, institution, or agency where they have received treatment. While the medical report form was designed for the convenience of the physician, it is not required that he use this form; a narrative summary or photocopies of pertinent records are acceptable.

Mental institutions, sanatoriums, and hospitals for the aged and chronically ill have received more requests to complete medical reports than have general hospitals since a higher proportion of their patients qualify under the disability provisions. We fully appreciate that completing a multiplicity of forms creates an unusual burden on these institutions. We believe that they will be relieved of much of the problem when disabilities that had their onset a considerable time prior to application no longer form such a high proportion of the workload. For purposes of the disability freeze, applications have been accepted from individuals whose disabilities began as early as 1941. In these cases it is usually quite dif-

ficult to reconstruct reliable records. After June 1958, a period of disability cannot be established beginning earlier than 1 year from the date of the application.

One of our problems is to dispel some of the misconceptions that attending physicians have about their role in the disability process. Many doctors feel, and I suppose with considerable justification, that they should be reimbursed for the cost of preparing the medical report. We fully appreciate the feelings of physicians who ask for a fee when it is obvious from the patient's attitude that he does not expect to pay for the service. But, as a matter of policy, we require the applicant at his own expense to furnish us with records which reasonably support his claim.

Other doctors are perturbed when asked to complete medical reports for individuals whom they have not seen for many years. We seem to have great difficulty in getting over to them that the report requested is not intended to portray the present medical condition but relates to the medical condition at the time the physician last examined the individual.

In many cases, the medical evidence submitted is inadequate, and it is necessary to write back to the reporting physician. Many doctors believe that a simple statement of diagnosis, prognosis, and opinion as to the degree of disability is the type of information required. Actually, the determination of disability is made principally on the basis of clinical and laboratory findings. The applicant's doctor is not asked to make a determination of disability. We ask only for complete enough clinical information to allow a reviewing physician to evaluate effectively the incapacity and the probable future course of the condition.

The law requires that all disability applicants be referred promptly for State vocational rehabilitation services. Insofar as possible, the process of determining disability is geared to provide facts about the person's impairment and residual capacities that are also useful in identifying the kinds of services needed for rehabilitation.

By July 1957, 400,000 applicants had been referred. Case disposition reports had been received in 140,000 cases. These reports show that only 7 percent of the applicants had enough potential for rehabilitation to be accepted for services. Since a very large proportion of the persons referred were in the older age group and suffered from serious and long-standing disabilities, we could hardly expect to find many vocational rehabilitation prospects among them. As the backlog of long-standing disability cases is eliminated and as the more recently disabled come to form a higher proportion of applicants to the Bureau of Old-Age and Survivors Insurance and, thus, of Bureau referrals, we may expect the practical effectiveness of the referral program to be greater than indicated by the data now available.

An immediate problem, however, is how the vocationally unrehabilitatable can be helped to realize their maximum potential for self-care and a satisfying life. Here is an area where much might be done through demonstration projects of services to disabled beneficiaries, perhaps with a State health agency assuming responsibility for the organization of the special services needed.

Public Assistance Medical Care

There exists a great variety of methods of providing medical care to recipients of public assistance. The methods differ not only from State to State but among the localities within the same State. Medical care for this group has been traditionally a local responsibility, but such responsibility is gradually being supplanted or supplemented by State programs and, to a lesser degree, by Federal grants-in-aid to the States. The Federal grant, by requiring statewide participation, is undoubtedly a factor in the extension and improvement of provisions for medical services to needy people.

Federal participation in the financing of medical care has, however, been very modest. While public assistance costs, including general assistance, are presently running at the rate of about $3 billion annually, only about 9 percent of the total in calendar year 1956—$269 million—was in the form of vendor payments made directly to hospitals, doctors, druggists, nursing homes, insurance companies, and so on. Of the total vendor payments, less than one-fifth was made from Federal funds. An-

other $100 million was included in the money, or so-called cash, payment to recipients to give them funds to pay for medical care; perhaps as much as three-fifths of this amount came from Federal funds.

A large part of all vendor payments has been concentrated in a few States. Of the vendor payments made for the aged in June 1957, half were in New York, Illinois, and Massachusetts.

Until July 1957, Federal participation in medical care for public assistance recipients has been subject to an individual monthly maximum (currently $60 for adults) which determined the Federal share of both maintenance payments and medical care. In 1956, Congress provided separate matching for medical care on an average basis. The average monthly amount in which the Federal Government will share on a fifty-fifty basis was set at $6 for every adult and $3 for every child on the assistance rolls.

Following the 1956 medical care amendment, 13 States have for the first time submitted plans as a basis for claiming Federal participation in the medical care payments in one or more categories of public assistance. In other States which have had established medical care programs, the ratio of medical care costs to total public assistance is rising.

The States that are now moving into medical care for recipients of assistance are those with the least economic resources. They, more than States with well-established programs, must examine their plans most carefully. These States especially need professional help in planning how best to spend an amount that is recognizably inadequate for the job to be done.

It appears that an ever larger portion of the dollar for public assistance will be spent for medical care. With the social insurance program carrying the burden of income support, public assistance will be increasingly concentrated on people with heavy medical needs.

Let us turn now to another development in which health and welfare people are jointly concerned: the possibility of restoring former mental patients to normal living arrangements after institutional care is no longer indicated. No one would argue about the desirability of arrangements that make it possible for such people, many of whom have spent most of their years in institutions, to participate again in a normal life. But I think we should recognize that the joint efforts of our health departments and our welfare departments in making such arrangements may run into financial barriers involving total cost and how the cost is shared. The costs involved in returning a former patient to the community frequently include costs of basic income support to be provided through the Federal-State program of public assistance and always include costs of services for finding a suitable place to live and to adjust to a new way of life. In the long run, these costs may be no greater than costs of good institutional care. But their financial impact is different. Whereas the State budget had carried the full cost of the institutional care, the locality may now be called on to share costs, at least for services. And while the total cost borne by the State and its localities may be lower because of Federal participation in public assistance, the mere fact that some local financing is involved can prove an almost insuperable barrier.

Nursing home care constitutes another area in which we have a strong mutual concern. In the recent study of nursing homes in 13 States which the Public Health Service made jointly with the Commission on Chronic Illness, it was found that fully half of all proprietary nursing home residents were recipients of public assistance. Furthermore, assistance funds were paying the full bill in 4 out of 5 of these cases. In most of the States the average payment made to the nursing homes in behalf of recipients of public assistance was considerably below the private-pay average. This highlights a very difficult situation—the problem of financing nursing home care by public assistance at rates that will buy really good care.

Some welfare agencies have already recognized that it may cost less in the long run to pay nursing home charges that include restorative and rehabilitation services than to pay, over a much longer period of time, charges for care that merely permits the patient to live out his days in bed. The new public assistance provisions for medical care may make such financing increasingly feasible.

The welfare field must rely on the public health field for a large part of the task of seeing that these nursing homes are safe and sanitary and for improving their standards so that they

are more than mere depositories for human beings. Skilled nursing services, restorative activities, and adequate medical supervision are minimums which are sadly lacking in some of these establishments.

I feel that I speak for public welfare people in general when I say that public welfare agencies have no desire to become medical agencies. We believe that the department which is under medical auspices should have an important voice in developing the medical aspects of social insurance and welfare programs. We who are concerned with the social security programs are ready, eager, and willing to cement our partnership with those in the public health field. Through a truly cooperative endeavor, the competency of each can be brought together for the general well-being of our total population.

Charting the Growth Of Radiation Hygiene

By Russell Morgan, M.D.
Special Consultant on Public Health Aspects of Radiation
Public Health Service

Public exposure to radiation is becoming a major concern of health agencies.

The major users of radiation may be categorized as medical, industrial, agricultural, governmental, and military.

The major sources of radiation may be classified as X-ray machines; other particle accelerators such as the betatron, which is coming to have increasing industrial application; natural sources, including radium and radon; radionuclides that have been produced or concentrated by the hand of man; nuclear reactors, including their fuels and wastes; and weapons.

The biological effect of radiation that has attracted particular attention in recent months is genetic, that is the disruption of chromosome material. Not only are damaged chromosomes in germ cells productive of changes in the future generation, but changes in the chromosomes of somatic cells are productive of changes in tissues in the present generation. Such somatic effects may be cancerous in character. There is no question that radiation is related to the incidence of leukemia. And its life-shortening effects seem to be well indicated, if not precisely known.

The immediate task is to place radiation hazards in perspective in the total enterprise of public health. Studies have begun toward this end, and the information available is not all that could be desired to organize firm conclusions. Nevertheless, preliminary figures provide some basis of comparison between radiation injury and such disease entities as poliomyelitis, tuberculosis, heart disease, and mental illness.

It appears that, unless the present trend in gonadal exposure to radiation is checked, genetic injury may be expected to produce more deformities in future generations than have been suffered from anterior poliomyelitis. The health burden of radiation injury at present is roughly in the same order of magnitude as the burden of tuberculosis. In 5 to 15 years, unless adequate safeguards are instituted, the health burden of radiation injury may be close to that of heart disease. Radiation is unlikely to be as much of a burden on the health and economy as mental illness. But radiation hygiene will be significantly and substantially more important in public health practice in the next few years.

What programs may health agencies be expected to develop for radiation hygiene? The foremost need is for research in both fundamental and in applied radiobiology. Such research is needed to bolster standards of radiation safety. It is no secret that the maximum permissible dose limits that have been recommended are arbitrary judgments, based upon assumptions no less than upon facts. And only effective research can supply the facts to replace assumptions as the basis for reasonable, intelligent, and practical measures of radiation safety.

It is also important to develop a general understanding of the public health significance of the increasing number of radiation sources. Although excellent work has been done to explain the physics, the engineering, and the functional aspects of radiation, little has been done

to stimulate education in public health aspects of radiation. Such education, training, and experience is of course basic to the application of a program of radiation hygiene.

With respect to the regulatory aspects of such a program, it is a sound policy, accepted in most political institutions, that the agency which promotes an activity should be separate from the agency which inspects and polices that activity. For example, there is a current public conflict between the interest, economic and administrative, of promoting the construction of power reactors near centers of population, and the interest of public health. It is a responsibility of health agencies to protect the public health interest with respect to such projects.

Health agencies inclined to work on radiation hygiene are not necessarily at a loss for qualified counsel. In many universities there are men who have sufficient acquaintance with the physics and biology of radiation to provide the health official with guidance. A first step for a health department might be to prepare an inventory of people who are qualified and willing to help in these decisions. Another step is to develop an inventory of radiation sources within the agency's jurisdiction. And the surveillance of these sources will permit the agency to determine what needs to be done.

Progress Report on Air Pollution

By Vernon G. MacKenzie, B.S.
Assistant Chief, Research and Development
Division of Sanitary Engineering Services
Public Health Service

Air pollution, in its modern form, may be taken as a prime example of newly developing public health problems associated with increased urbanization, intensified industrial activity, greater use of transportation, fuel usages, and refuse disposal practices. Activities of this kind, connected as they are with modern urban living and a higher standard of living, are essential and beneficial to organized society; the problems they create, therefore, are strikingly characterized by the fact that they are not solely detrimental to public health. And, too, unlike the older problems of communicable diseases, these new problems cannot be "stamped out." They must, however, be controlled and kept within safe bounds.

Several factors contribute to the increased complexity of the air pollution problem: changes in fuel usages, increased per capita use of energy, and increased per capita consumption of materials. A revolution in fuel usage has occurred in the last half century. In 1900, 90 percent of the fuel energy in the United States came from solid fuels; today, 70 percent comes from liquid and gaseous fuels. Equally striking has been the huge amount of energy made available to us, and the greater per capita use of raw materials and of finished products from them. Visible smoke pollution problems, which could be abated by relatively simple measures, have been superseded by the more complex problems of contamination by gases, vapors, and miscellaneous particulate emissions.

Air pollution problems are widespread throughout the United States. One survey has estimated that 10,000 communities in this country are affected by air pollution. The magnitude of local problems ranges from contamination produced by a single factory stack to "smogs" spreading and mixing over entire metropolitan areas.

Evidence of damage to livestock, vegetation, and physical structures by various air pollutants is reasonably well documented, although incompletely understood. Economic losses from such causes have been estimated at more than $1.5 billion per year.

Equally well documented is the fact that air pollution can cause personal discomfort, such as eye and respiratory irritations, or even human illness and death under conditions unfavorable to the atmospheric dilution and dispersion of contaminants. Of perhaps equal public and professional concern, although without documentation, has been the potential long-range effect of pollutants on human health. Although the evidence of causative relationships between specific atmospheric contaminants and the effects upon humans is incomplete, the intensity of pollution has impelled undertaking air pollution controls in many areas even in the absence

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of knowledge on specific etiological relationships.

Air Pollution and the Law

Local ordinances for the control of air pollution have long been a part of American government. The first smoke-control laws were adopted by Chicago and Cincinnati in 1881. Comprehensive control of air contaminants, however, is a recent development. The major impetus in the enactment of air pollution control legislation has come since World War II. In a recent study, it was found that more than 80 percent of the ordinances of 110 cities, representative of various population sizes, have been enacted within the last 15 years. Further evidence of the growth of local programs is afforded by the Directories of Governmental Air Pollution Agencies published in 1955 and 1957, the number of local agencies listed increasing from 115 to 279 in the 2-year period.

On the State level there has long been a history of sporadic ad hoc activity of technical study in connection with specific air pollution problems, principally by State industrial hygiene organizations. Recently, however, there has been increasing interest in the organization of State programs explicitly authorized by statute. The first of these laws was passed in Oregon in 1951. It established an air pollution authority in the Oregon State Board of Health with powers to study and legally enforce all aspects of air pollution. Similarly comprehensive legislation in Massachusetts and New Jersey followed in 1954. A State air pollution program was authorized in California in 1955 and in 1957 in seven additional States (Colorado, Delaware, Florida, Minnesota, New York, Ohio, and Washington) and the Territory of Hawaii.

The circumstances contributing to the enactments differ from State to State, resulting in considerable variation in the laws, and there has been but little operating experience under them. Several features of these laws, however, deserve mention:

1. All of the laws would apparently authorize studies and technical assistance for local problems.

2. Ten of the twelve enactments extend coverage to all air pollution problems; two would restrict the authority to instances detrimental to public health.

3. Eight of the twelve laws provide for some legal control of air pollution on a State level.

4. In every instance, the State health department is named as the operating agency; in five instances, a board, commission, or authority is also established with interests other than health represented.

Only one legislative step has been taken in relation to an interstate air pollution problem. Under legislative authority enacted by the States of New Jersey, New York, and Connecticut, and ratified by Congress in 1956, the Interstate Sanitation Commission is studying the interstate problem in the New York-New Jersey area and will report to the legislatures of these two States.

If there is any lesson to learn from the history of State and local air pollution control legislation to date, it is that the individual law or ordinance should be tailored to the situation and take into consideration the varying circumstances and needs of the jurisdiction involved.

Public Health Service Program

The Public Health Service program on air pollution, authorized by the 1955 act, is now in its third year. The act authorized a 5-year program of research and technical assistance at a maximum annual cost not to exceed $5 million. It specifically reserved to the States and local governments the responsibility for legal control of air pollutants. Approximately $8.5 million has now been appropriated under the act, $1.75 million in 1956, $2.75 million in 1957, and $4 million in 1958.

The major emphasis in the program is on research. Approximately 80 percent of the resources are devoted to this purpose, and the remaining 20 percent are used for training and technical assistance on specific problems. From another viewpoint, approximately 60 percent of the available budgetary resources are devoted to physical science and engineering control studies and 40 percent to studies on the effects of pollutants on health. From a third viewpoint, about 45 percent of the program resources are used for intramural Public Health Service activities, with the remain-

der divided about equally between outside grant and contract studies. All grants and contracts are on a project basis; the act does not authorize general support or formula-type grants.

Although much of the research is necessarily of long-term character, some results are already appearing in reports and publications concerned with the identification and measurement of pollutants in the atmosphere, the factors affecting the behavior and dispersal of pollutants in the atmosphere, the effects of air pollutants, and means for their abatement.

Work under way on improved methods of analysis has led to a promising development for continuous monitoring of fluorides and an improved smoke inspection guide for use by local authorities. Other areas in which progress is being made include tracing pollutants to specific sources, filter fabrics for high temperature gas streams, and improved design for refuse incinerators.

The lack of basic data on the nature of air pollution has led to the creation of the National Air Sampling Network covering 110 urban and 25 non-urban sites. This network, operated in cooperation with States and communities, may provide data on air pollution which can be correlated with geographic, demographic, meteorologic, and other variables.

That part of the program concerned with the effects of air pollution on human health has initiated toxicological studies to determine the effects of pollutants on animals and biological systems, and clinical and epidemiological studies to determine the effects on human beings. The compilation and publication of mortality data by cause of death for 163 metropolitan areas have provided an important working tool for use in this and other fields of study. Another example of medical research recently initiated is a study undertaken in cooperation with the National Cancer Institute and the University of Southern California on the carcinogenicity of aliphatic and aromatic fractions of air pollution samples collected in eight metropolitan areas through the National Air Sampling Network.

In the 2 years since the initiation of the air pollution program, several hundred requests for technical assistance on general and specific air pollution problems have been received from State and local government agencies and other organizations. The assistance provided by the Service has depended, of course, on the resources available and has varied from limited consultation to assigning personnel to work cooperatively with State and local agencies.

Staff members have been assigned to studies in the States of Connecticut, Washington, California, and Tennessee, and in Louisville, New York, Los Angeles, Philadelphia, and other areas. The cooperative State surveys which have been made in Connecticut, Washington, and Tennessee have, I believe, demonstrated a means of appraising the statewide air pollution problem at reasonable cost.

In addition to the direct technical assistance activities of the Service, demonstration project grants have been provided for study of local and regional problems. Such grants have been made to the State health departments of California, Colorado, Illinois, and Indiana, to the city-county health unit of El Paso, Tex., the Interstate Sanitation Commission, and Oregon State College. Other demonstration project grant applications are pending.

To assist in the alleviation of the shortage of technical personnel trained in air pollution research or control, the Service has been conducting short-term training courses at the Robert A. Taft Sanitary Engineering Center in Cincinnati; more than 500 trainees attended the training courses during the last fiscal year. In addition, the Service has made grants to 10 universities distributed across the country for initial development and support of graduate level curriculums, and for a limited number of traineeships.

With 2 years of the program completed, a considerable volume of results from the various studies undertaken are beginning to flow in. The Service hopes to make this information available at the earliest feasible date. Consequently, a more formal system will shortly be inaugurated for disseminating information derived from the Service's direct air pollution studies and from grants and contracts which it is supporting. Reports of a general nature together with lists of projects undertaken and other reports, publications, bibliographies, conference proceedings, and similar informational material will be available shortly.

COMMUNITY HEALTH SERVICES

At one of the conference sessions, three local health officers described activities illustrative of the theme "developing new local health department programs within existing community organization." Their papers follow.

Rehabilitation In San Mateo

By Harold D. Chope, M.D., Dr.P.H.
Director of the Department of Public Health and Welfare, San Mateo County, Calif.

Within the last 3 years, a forgotten part of the California county of San Mateo has been found, and what was to many a life without hope has become a life with purpose and dignity. The story that I tell, however, is not just of a few disinherited individuals who were provided for, but of an entire county that became involved with the problems and satisfactions of rehabilitation. For, upon a foundation of resourceful social and public health workers, community interest accumulated to form a bridge upon which all might walk.

San Mateo County is relatively small, covering 448 square miles on the San Francisco peninsula. It is bounded on the east by San Francisco Bay, on the west by the Pacific Ocean, on the north by the city and county of San Francisco, and on the south by Santa Clara and Santa Cruz Counties. The county is split down the middle by a range of hills which protects the eastern slope of the county from the chilling winds of the Pacific, and it is here that the population is most dense. On the western slopes are the sleepy little towns of Half Moon Bay and Pescadero, still supporting a way of life with fishing, cattle, and truck gardening not much different from the early days.

The people who live in San Mateo are young (the median age is 31.4 years), relatively well educated, and have an income that averages $1,400 higher than the United States as a whole. They form a community which in recent times has become increasingly urban, with light industry and decentralized shopping centers burgeoning about them.

The San Mateo Department of Public Health and Welfare, first established in 1932, is now organized into five basic divisions: administration, recently added to the department; public health; social service; county hospital, including outpatient and psychiatric facilities; and the tuberculosis sanatorium. The social service division operates two institutions, a 17-bed home for dependent and neglected children and the 135-bed Crystal Springs Rehabilitation Center.

The most extensive reorganization of the department has taken place since 1948 as a result of a complete survey ordered by the board of supervisors.

In 1948 the county faced many problems. World War II had prevented not only the normal increments in a building program but had made impossible the development of physical facilities to serve the rapidly growing population. While the department had many excellent employees, there was need for more employees, considerable reorganization, and the recruitment of new leaders in some disciplines. Much time during the first 4 years (1948–52) of the present administration was spent in construction, recruitment, and reorganization. The new addition to the Crystal Springs Home was completed in 1949. An entirely new 120-bed tuberculosis hospital was dedicated on March 2, 1952. A bond issue to enlarge the county hospital was approved by the voters in November 1952, and the addition was completed at the end of 1956. In 1953 the health and wel-

fare divisions moved out of the basement of the courthouse into a new 50,000-square-foot administration building on the hospital site.

Rehabilitation Begins

During this period there was considerable fomentation regarding rehabilitation, much of the stimulation coming from Dr. Lester Breslow, chief of the bureau of chronic diseases of the California State Health Department, but nothing that could be delineated as a formal rehabilitation program. While there was much reviewing of current articles, conferring, and verbalizing about rehabilitation, this amounted to little more than the fertilization of the soil in which our now beginning program was to grow.

I think that at this point it is only fair to point out that, while the desire for a rehabilitation program existed with the medical administrative personnel of the department, and various specialties in medicine have made major contributions, the real leadership came from the social work discipline.

Until February 1954, the Crystal Springs Home had been operated as a "relief home," with the "inmates" receiving "custodial care for elderly indigents." Adrian Ward, superintendent of the social service division at that time, recommended as the new manager Einor Nordby, a man with broad experience in social work. Mr. Nordby brought to his new job more than good training and broad experience; he brought two other characteristics of inestimable value: a strong conviction about the values of rehabilitation and an abiding faith in the infinite capacity of human beings to overcome seemingly insuperable handicaps and, I might add, a sincere respect for human dignity. Within a few weeks, the "relief home" had become the "Crystal Springs Rehabilitation Center," the "inmates," "patients," and "custodial care for elderly indigents" became "rehabilitation treatment services for patients with long-term illness."

While it did not take long to change names and terms, it took a little longer to develop the program and philosophy indicated by these terms and to teach a largely untrained staff to center their efforts on restoring dignity, status, self-respect, and self-esteem in the individual patient. The dietary was improved after a survey by the nutrition section of the State health department. Little things were initiated, such as arranging the mealtime to suit the patients rather than the staff, placing sugar and condiments on the table to afford patients free choice of seasoning, providing a before-bedtime snack of graham crackers and milk, consulting patients on their likes and dislikes, and serving food as attractively as possible instead of prison style. None of these things alone had too much significance, but each indicated to the patients that the management considered them humans capable of personal decisions, with opinions of value in determining policy.

A second method of providing motivation to the patients was to form committees to discuss policy and program—a library committee, an occupational therapy committee, a patient's service committee. Budgetary limitations did not permit the employment of additional staff the first year of operation, so the manager and the committees turned to the community for volunteer help. The relief home had been shunned by the community, except for a few stalwart church groups and people "wanting to do something for the poor" during the holidays. But with the new spirit, which is hard to describe but was immediately felt, community organizations, service clubs, church groups, women's clubs, and others became enthusiastic sponsors of various rehabilitation activities, providing materials, tools and money, and finding qualified volunteer arts and crafts teachers. The patients exhibited their handiwork at the annual fiesta (county fair); they organized an annual bazaar and started a monthly newspaper.

These activities gave status and helped restore sadly depleted self-esteem. The "inmates" were again human beings with personalities and skills. These activities gave new hope and incentive, but this was not enough. The physically disabled were still disabled though their outlook had improved. The mildly depressed responded well, but the severely depressed were still depressed. Again volunteers were recruited—a psychiatrist, a half-time physical therapist, social workers in the evenings after their regular day's work.

Time does not permit a step-by-step development of the program through the next 2 years, but the demonstrated accomplishments convinced the board of supervisors, and we started fiscal year 1958 with a fairly adequate professional staff consisting of a part-time psychiatrist, a full-time psychiatric social worker, a part-time medical physiatrist, 2 physical therapists, 1 full-time and 1 half-time occupational therapist, 2 part-time internists, a part-time vocational counselor, a full-time dietitian, and a nursing director with a master's degree, experienced in care of the chronically ill.

What has this type of service cost the taxpayers of the county? Do the results justify the added expenditure?

The indigent custodial care, consisting of food, shelter, and minimal medical care, cost the county $4.96 per patient-day for the fiscal year 1953–54. In the year 1954–55 the cost increased 54 cents per patient-day to $5.50. In 1955–56 the cost went up another 50 cents to $6 per patient-day, and in 1956–57 it rose to $7.55 per patient-day. This represents a $2.59 increase over the $4.96 of 1953–54, or a 52 percent increase in costs. The cost increase is not all chargeable to rehabilitation. Increases in salaries, enlarging the nursing staff, rising costs of operation, and conversion of custodial beds to treatment beds account for most of it. The actual salaries for the professional staff associated with the rehabilitation program and the supplies and equipment amount to 45 cents per patient-day.

What did the county get for this? During the year 1956–57, 12 patients were restored to full-time employment, relieving the county of all financial responsibility ($12 \times \$2,756 = \$33,072$), and 41 patients were returned to private living in the community at far less cost than institutional care, a net saving of $69,790.

These figures and calculations have value in budget analysis, but to me they are not the important results of a rehabilitation program. What criteria do we have to measure social value? What is the worth of human dignity to the individual? What is a new lease on life worth to a man who was totally defeated and contemplating suicide? What is it worth to his wife and family? What is the money value on the extension to 1 year or 10 years of active, independent, and productive living of a man who at 55 was rejected and disabled and felt discarded by society? Can society afford to rescue a woman of 70 from the living death of permanent bed rest with attendant evils of premature senility and retrogression to infantilism?

Subjectively, I am much happier to be responsible for an institution around which the community rallies, with the garden club planning landscaping projects, the cosmetologist association helping start beauty parlors, and church groups providing spiritual counseling, than to be responsible for the operation of a "poorhouse."

Broadening the Program

While the tangible and intangible rewards of expanded institutional care were many, there was still much to be done for those outside the institutions: the recipients of general assistance. Again we called on our State health department for a study to review programs and outline the needs for medical social workers. In September 1954 we established a medical social work service.

A study of the general assistance recipients in the county revealed that about 58 percent were dependent because of alleged poor health. This seemed to be a serious indictment of a department which had available all of the modern facilities for prevention and treatment of physical illness.

Although many were receiving care in the outpatient clinics of the department, it was decided to employ an internist in February 1955 to give thorough physical examinations to public assistance recipients and to serve as liaison between the social workers and the outpatient staff.

In a review of the work, 16 months later in June 1956, it was found that 75 percent of the men examined fell into five diagnostic categories: chronic alcoholism, chronic pulmonary disease, hypertensive vascular disease, neurological disease, and orthopedic defects. The women presented a different picture: 40 percent had a diagnosis of psychoneurosis or psychosis, and 23 percent had no diagnosable disease. It was obvious that physical health alone was not a major cause for the recipient's dependency. With these findings we approached

our psychiatrists in the adult psychiatric clinic. They declined to participate on the basis that the volume of cases was too large for them to handle and that the recipients would be uncooperative and unamenable to therapy. Although not accepting the recipients for individual or group therapy, the psychiatrists did consult with the rehabilitation team.

In September 1955, a part-time vocational counselor started testing the recipients, and the team in a staff conference attempted to summarize all data on each recipient and to rate the recipient as to potentiality for rehabilitation according to five factors: motivation; physical condition; skills and abilities; personal adjustment, including intelligence; and social adjustment. Using a scale of A through E for rehabilitation potential, we found that exactly 50 percent of the patients studied had a rating sufficiently high (A, B, or C) to justify further efforts.

As we moved along in this study, we observed that some of the patients, although appearing to have rehabilitation potential, had suffered such a long series of tragic experiences and had endured these experiences for such a prolonged time that they had come to accept passively their dependency and disability role. Many had tried to get jobs and had been rebuffed or had failed so many times that they no longer had the courage to seek a job or the confidence that they could hold one if found. So in October 1956 we started a work experience program. This was not the kind of a program where the clerical worker is put to raking leaves or picking up beer cans in the public parks. After the vocational counselor had delineated the possible skills of the recipient, an effort was made to place him in one of the county departments for work experience or he was referred to the California State Department of Vocational Rehabilitation for training. Mechanics were put to work on the county cars; women with sewing skills, in the linen rooms of the institutions; and recipients with clerical skills, in the various offices of the county. This relatively sheltered and planned experience was sufficient in a surprising number of cases to convince the recipient that he was able to work productively, and many sought and obtained private employment.

Our most recent step, in August 1957, was to establish an industrial rehabilitation workshop under the direction of a trained occupational therapist.

Our next anticipated step is the formation of a citizens committee with representatives of labor, management, civic groups, local government, and interested persons to see if we can further our rehabilitation process.

Implications for Others

State and Territorial health officers might well ask, "What has all of this to do with our programs?" What has been reported is an isolated incident in an unusual type of administrative setup which exists only in this one small county in all of the United States.

But let me summarize the implications for State health officers implicit in this case report.

1. Specialized consultation (statistical studies, nutritional studies, and social service consultation) is available on the local level from State health departments.

2. If public health administration is to pursue vigorously the now accepted objectives of reducing chronic diseases and improving mental health, that segment of our population on welfare rolls presents a rich field for administrative study and the development of techniques.

3. Successful rehabilitation will not be accomplished by any single discipline but by a careful synthesis of the contribution of many professional disciplines: the physiatrist, the social worker, the vocational counselor, the physician, including the specialist in psychiatry, and the administrator.

4. Results in rehabilitation may be accomplished by using the time-honored techniques of public health administration: careful delineation of a problem, selection of a specific segment for early efforts, locating, employing, and supporting well-trained staff, utilizing community resources, obtaining budget and financial support for the project, and keeping the community informed of progress. A local health officer does not need an administrative organization such as ours to further rehabilitation. A health officer, for example, in a county south of San Mateo has done an outstanding job with the traditional organization.

In the field of rehabilitation we should constantly keep in mind that beautifully confused metaphor of Charles Chapin: "It is not for me to 'set the river afire;' but there is many a great edifice builded of small stones."

Improving Patient Care In Nursing Homes

By Herbert R. Domke, M.D., M.P.H.
Commissioner of Health
St. Louis County, Mo.

Achieving improved care for nursing home residents requires coordination of many services, professional groups, and agencies, a function that is uniquely suited to the health department through its legal responsibilities for inspection and its pivotal position in the community.

As an inspection agency the health department can collect information on patient care and nursing home operation which may be a basis for developing programs.

As a formal unit of government, the department is in a favorable position in helping formulate proposed legislation.

Through its work with all nursing homes in a jurisdiction, the health department can help the nursing home operators, individually and as a group, develop professional understanding that can lead to improved techniques of patient care and other aspects of nursing home operation.

The health department, because of its relationships with other governmental and voluntary agencies, can foster varied community services related to patient care and adjustment. A special activity may be interpreting more accurately to the community the nursing home's role in meeting problems of the aged and chronically ill.

In Missouri, the St. Louis County Health Department, through its nursing home inspection program, acts as agent in enforcing State nursing home legislation in the county. From this basic service, the program has branched out into research, legislative, and training activities.

In comparison with national data the nursing homes in St. Louis County are reasonably typical. Data by age distribution, type of medical and nursing service needs, and financial support show that county homes and patients are in the median range for the United States. There are 15 nursing homes with less than 10 beds and several with more than 100 beds. The majority are privately operated; some are under church or other charitable sponsorship. The 60 homes in the county have a total bed capacity of more than 2,000, a larger number of homes and beds than would be expected for the St. Louis County's 600,000 population. The disproportionately large number is almost certainly the result of an enforcement code adopted by the city of St. Louis more than 30 years ago. The county had no licensing program until the State adopted its first nursing home legislation in 1941.

Legislative Action

The nursing home program, along with other aspects of chronic illness and aging, has received considerable attention in the community. Much of this program carries out recommendations made in a survey of chronic illness published by the St. Louis Social Planning Council in 1946. Also, in 1953 a Missouri nursing home association sponsored a bill designed to correct many obvious deficiencies of the 1941 law. However, the bill did not pass.

The health department began emphasizing the nursing home program early in 1954. At that time its official governing body, the St. Louis County Council, provided funds for establishing a chronic disease control section, partly to expand the existing, inadequate inspection. Acting on a recommendation of the Social Planning Council, the county council also authorized a survey of all nursing homes and their residents. The survey, utilizing the Commission on Chronic Illness forms, provided much new information.

Precise survey data pointed up defects and inadequacies of existing State legislation, further supporting the legislation sponsored by the nursing home association. In 1955, the association-sponsored bill, slightly modified, was reintroduced, and with broader backing

was approved by the State legislature. Unfortunately, the bill contained a provision which was held unconstitutional. In 1957, impelled by the disastrous nursing home fire in Warrenton, Mo., the legislature amended the licensing and regulation bill, which is now the basis for regulation.

The most controversial part of the present act provides for licensure by the type care the resident needs. The survey made by the Commission on Chronic Illness was especially valuable in supporting this provision because it showed a wide range of patient needs—from essentially boarding care to medical and nursing services at almost hospital level. For the first time in Missouri, it is possible to define minimum nursing home standards appropriate to a realistic appraisal of patient need.

Probably no one code can be a definitive answer to legislation and regulation, but this bill already has markedly improved patient care. Without the background of legislative review before the Warrenton fire, revised legislation would possibly have been restricted to fire safety provisions.

Survey of Nursing Home Residents

The Commission on Chronic Illness survey provides information about the resident's medical and nursing needs. Many other concerns, however, are expressed by the resident, his family, and the community.

Nursing home facilities continue to expand despite a general tendency to consider the home as an undesirable, last resort solution to the individual and family problem. Although there are some studies of psychological and social adjustment of the aged, including those in nursing homes, adequate information is not available on the factors important in placement and adjustment of the resident to the home. Certainly we had no such information in St. Louis County. More data were necessary to develop programs such as family counseling.

In 1955 a further special study of county nursing home residents became possible. Its purpose was to ascertain the circumstances leading to the use of the nursing home as a patient's way of living, the response of the patient to the solution of his problem, and any change that might be made in him or his living arrangements that would restore or maintain him at his maximum level of functioning and happiness.

This study was jointly sponsored by the Chronic Disease Division of the Public Health Service, the Brown School of Social Work of Washington University, and the St. Louis County Health Department. General research policy was formulated by a committee of personnel from the three agencies. The school assumed responsibility for the execution of the project by its graduate students.

A sample of 36 residents from 23 different homes was selected for intensive interviewing. Residents interviewed were restricted to those who were clear of mind, had lived in the nursing home for a year or more, and had at least one close relative living in the St. Louis metropolitan area.

Detailed interviews of the resident, his relative, and the nursing home operator were conducted. Aside from the specific criteria of selection, analyses showed that the residents were essentially representative of the nursing home population when compared with the Commission of Chronic Illness data. Although the extensive interviews are a major asset, the small size of the sample can only represent a pilot study and the findings are not definitive. This unpublished study was compiled into one volume and presented as a joint master's degree thesis for many 1955 graduates of the school. The following discussion covers only a few of the factors studied and reported in the thesis.

The policy committee approached the study with certain preconceived ideas as to what it might find. Members thought many residents would totally dislike nursing home living, that relatives did not visit regularly, and that residents missed diversional activities. In this respect, the committee probably reflected the general community attitude toward nursing homes.

With due consideration for the small sample size, it is interesting and significant that these assumptions were not borne out. For example, 32 of the 36 residents, almost 90 percent, were found well adjusted on the basis of interviews with the resident, the relative, and the nursing home operator. Only 4 could be judged dissatisfied and had had a deteriorating course

of adjustment. Another set of data on psychological change in the patient after entry showed that approximately 1 out of 6 was improved, 1 of 5 was worse, and the remainder showed no change. Nursing home placement did not appear to have been generally deleterious for patients.

Although 8 of the 36 were entirely satisfied with their placement, and some of these 8 did not wish to return to a living arrangement with their families, the majority were only accepting of nursing home placement or had hopes, frequently unrealistic, of making other arrangements.

Data on Patient's Background

While these findings were certainly better than we anticipated, the background and expectations of the person who becomes a nursing home resident should be further evaluated. One surprising finding reflected in the favorable responses was that the women, who outnumbered men 4 to 1 in the sample, had had an unusual incidence of hardship as adults. Approximately 40 percent of the women had to assume complete financial responsibility for self and family at some time during their mature years, usually when they were widowed. This and other data indicated that the lower socioeconomic group in this community was more likely to select nursing home placement. Generally all the data pointed to the placement as an appropriate solution for the resident and his family.

Another finding was that the patient or family frequently did not consider a nursing home placement until shortly before the decision was made. Adequate preparation and participation of the patient in the decision to move to a home appears to affect directly his adjustment. The resident was much more likely to be satisfied if he and the family had sufficient time and information to decide. Residents who were only accepting of the nursing home, or who were dissatisfied, had done less adequate planning, and the resident himself was frequently not involved.

In more than half the cases where the patient was not entirely satisfied, he was not consulted, or had known of the decision for less than 2 weeks before it was made. This implies that individuals and families are not adequately informed about nursing homes, and the community needs a better understanding of the services which they provide. The generally unfavorable reputation of nursing homes may well cause delay in considering them as a solution.

Operators' Attitudes and Training

The study attempted to assess the nursing home operator's interest and attitude toward patients and also sought the resident's attitude toward the operator. The residents had almost uniformly favorable comments about the operator. Residents believed the operator was interested in their welfare, and all were highly disappointed that the operator did not spend more time with them. In general, the information obtained indicates that the operator plays an important, positive role in the resident's adjustment to the nursing home.

Interviews with operators indicated that their primary concern was the physical aspects of care—keeping residents clean, properly fed, and protected. Social aspects, such as keeping residents occupied and combating boredom and discontent, seemed secondary. Although physical care was emphasized, this usually did not include rehabilitative efforts. Occasionally the expense of rehabilitation efforts led to negative attitudes toward rehabilitation work.

The operators' attitudes may well reflect the emphasis of official inspection, which has explicit standards for a home's physical facilities and medical and nursing care. But, at least in the Missouri legislation, other aspects of operation which may influence the resident's adjustment to the home get little attention.

The operator's attitude is also affected by his background and training. In St. Louis County a few homes are managed by physicians, some by nurses, and one by a trained social worker. Most operators' educational background and preparation do not include professional training. Some have had only a high school education. Although inspections influence the service provided, the nursing home operator is ultimately responsible for his institution and the care of its residents.

Improved patient care can come only when

the operator has a more complete understanding of patient needs and of the background of official requirements. Improved care requires also that appropriate techniques be known to the operator.

Certainly the nursing home operator requires many skills which he now has little opportunity to develop except by unguided experience. The operator's varied, and not always adequate, training for his job and his importance to the resident point to a serious program need. Although nursing home associations recently have begun to provide needed professional information, there are not now adequate training programs. Regulation and inspection are of great value, but a considerable area of nursing home operation remains outside the scope of legislation.

Training for operators is, we believe, one of the most important activities the health department can initiate to improve patient care. The St. Louis County Health Department for the past 2 years has sponsored a monthly training program for operators. These programs, planned with a committee of the operators, have reviewed available professional knowledge on a wide range of topics such as fire prevention, nutrition, and cost accounting. These voluntary meetings have been well attended and seem to be one way of increasing the professional knowledge of nursing home operation. Aside from their informational function, they allow operators to share their concerns and trade ideas.

Conclusion

The nursing home program developed by the St. Louis County Health Department with other community agencies includes collecting information and research, legislative programs, and operator training. The program stems from the department's legal responsibilities as the licensure and inspection agency.

Specific features of the St. Louis County program may not be adaptable in other areas. Our experience, however, indicates that the community, the nursing home operator, the patient and his family, and official and voluntary agencies see the program as an appropriate health department function.

Surgeon General Leroy E. Burney in a recent address to the convention of the American Nursing Home Association stated:

> "Good administration, both within an institution and in licensing agencies, should be based on education and assistance, rather than on compulsion. . . . Standards and regulations should be in the form of basic principles, rather than an outline of specific details.
>
> "Administrative difficulties, both in individual institutions and in public agencies, will not be satisfactorily resolved until the people of all communities accept nursing homes, in fact as well as in theory, as an integral part of their health services."

It seems to us that the health department can and should play an important role in achieving this goal.

Home Safety In San Jose

By Dwight M. Bissell, M.D., M.S.P.H.
Health Officer
San Jose, Calif.

In 1949 the city of San Jose, Calif., established an emergency first aid station and gave the health officer responsibility for administering it. Records were a necessary part of its operation. As we looked at the reasons that caused people to seek service, we were struck by the number of persons who had suffered accidental injuries. We were aware of the frequency of automobile accidents and of industrial accidents, but somehow we had never realized that such a large number of accidental injuries could occur at home.

We looked at the death records and found that year after year in our city of slightly less than 100,000 population 13 to 15 deaths were registered as due to home accidents. Few people had been interested in the fact that accidents were the third cause of death in our city, as they are in many other cities in California. We had a chapter of the National Safety Council, but it was interested primarily in industrial and traffic accidents. We knew that the National Safety Council was interested in home accidents, and we felt that the local chapter would be a natural ally in our concern about them.

Our health department personnel, numbering about 70, always work well together after we arrive at a group decision and agree on a program. We talked the home accident problem over at our division chiefs' meeting and decided to find out the degree of interest among those who would be working on this new problem. It seemed logical that nurses who visit families in their homes would be able to do some work in prevention of home accidents; that sanitarians who deal with housing and check on environmental sanitation of the home would be able to assist, too. Health education and vital statistics services would certainly be essential, and all of our epidemiological and administrative skills would be needed for a full-fledged attack.

When the subject was first presented to the public health nursing division, one nurse said, "Everyone has home accidents so what can we do about it, and why worry about it?" This comment gave us an opportunity to suggest that each of us record the accidental injuries occurring in our homes for a week or two to find out what really happens. Before the recordkeeping period was over, there was much discussion about the things that cause home accidents and about our unsafe environment. We began to hear comments about the number of home accidents. Environmental hazards seemed to be lurking everywhere. The experience produced convincing evidence that home accidents happen to all of us and that there are things one can do to prevent them. Most of our injuries, incidentally, were cuts and falls.

Community Participation

We have never tried to solve public health problems alone in San Jose. We believe that everyone who is interested has a right to share in planning and activities.

Each of us began to search for individuals or groups interested in home accidents. A number of insurance companies, we discovered, had a vital interest, and some of them were already active in this field. Some 30 industries were concerned, we learned by calling personnel directors together. Industry loses money every time a worker is absent from his job. He may be replaced, but the new worker is usually not as efficient as the old one. One large industry employing 3,000 or 4,000 men had a home accident prevention program "on the books." By bringing attention to that program, the industry was able to develop a more realistic one.

Another group that became interested in home accident prevention was the Apartment House Owners Association. Fewer accidents in the apartments would mean lower insurance premiums. PTA groups, welfare groups (particularly those serving old-age pensioners), and health agencies were others among a total of about 70 groups finally invited to send representatives to a meeting to discuss organization of a program to prevent accidental injuries in the home. Pediatricians naturally had a leading role, but dentists, surgeons, clergymen, and many others were also interested.

We had some doubters in this group too, but exploration of the matter convinced them of the value of preventing home accidents. In fact, one of the original opponents became the strongest supporter. He "sold" himself by asking questions. It was easy to sell those agencies that could see a financial gain in preventing home accidents. The social workers, for example, quickly realized that their aged patients were much more expensive to the county welfare fund when they had to be cared for in bed than when they were ambulatory. The PTA members realized that they could protect their children's health better if they knew how to prevent the many cases of poisonings, burns, cuts, falls, and other accidents characteristic of growing up.

Accident prevention is a matter of personal health, and some of the people working with this program almost became neurotic about the subject. Because of the emotional and personal aspects of these preventive activities, the program had a stimulating effect on every person involved. Disability and death were constantly evident. One could hardly mention home accidents without 1 or 2 people in the group relating a personal experience with a home accident. Identification of an individual or an audience with the problem was easy to establish. The death of a small boy from eating ant poison shocked the whole community into the realization that home accidents are extremely impor-

tant. Education projects in classrooms evolved from this incident, and teachers began to feel responsibility toward preventing home accidents as well as school accidents.

Our community group of 70 decided to organize, with the assistance of the health education division of the health department. Four active work groups and a steering committee were set up.

Initial Problems

Inquiring minds began to ask about the definition of terms, and definitions became a stumbling block for a time. The words "home" and "accident" had different meanings for different people.

Another problem was establishment of a baseline against which a statistical measure might be used to determine the value of the project to the community. With only a limited amount of money for this task and our desire to accomplish something, we did not establish a baseline satisfactory to some statisticians. We thought we had appropriate data, but we found on analysis that they were quite inadequate.

Death certificates are of limited value in determining the number of deaths from home accidents. For example, in our city the greatest number of such deaths are among people over 60 years of age, and the cause is generally a fall. Did the elderly man have a stroke and fall, or did he fall first, causing an injury to his head? Did the person with osteoporosis fall because of the thinning bone or because of the slick floor? Did the elderly man with a fractured hip who died of pneumonia 4 months after the injury die of a respiratory disease or from an accident? What was the intent of the person who took an overdose of medicine? Was it accidental or suicidal?

Morbidity data are even more likely to be inaccurate than mortality data. With rare exception, most of the morbidity figures I have seen for home accidents have been estimates. Some household sampling has produced results of apparent accuracy, but even these are still open to question. However, all of the statistical inaccuracies should not frustrate one completely. The data do give one a general idea as to causation and frequency.

What Can You Do?

Once we had acquired as much background data and information about the occurrence of home accidents as we could, our question to each of the 70 committee members was, "What can the organization you represent, or you yourself, do about preventing accidents?" If time permitted, I should like to enumerate all the extremely worthwhile projects these men and women suggested and carried out. Some were short-range projects aimed at maintaining interest; others involved long-range planning.

During the 5 years in which the Kellogg Foundation helped support our home accident program, we experienced all of the stresses and strains to which a health department is accustomed. Personnel who were working full time on the project changed. Even the health officer was gone for a year. Some excellent ideas failed to work out as planned. Inservice training programs were tried. Various methods of community education were used in this experimental project. Language barriers were encountered by foreign-born people.

Evaluation Efforts

The one question that we felt we must answer was, did the project do any good? Did it prevent home accidents in San Jose?

There is no known way in which an accident prevention program such as ours could be evaluated completely and specifically, for there are too many factors at work in a community: the local and national press, radio, and television, as well as experiences of neighbors and friends, to mention but a few. A 20 percent increase in the population during the 5-year period meant that many families had moved into the city and were exposed to accident hazards caused by a change in residence. There were changes in jobs, and many new industries were introduced. All of these factors had not only a physical impact but an emotional one as well. It would be difficult to claim that a particular event produced a particular result. Our own personal actions in preventing home accidents are produced by a mosaic of experiences.

What did the figures show? Because of the unreliability of available data, we did not give much credence to the death certificates, which

showed that accidental deaths decreased considerably. Approximately the same number of home accident cases were being treated at the first aid station after the program as before, but our population was increasing and people were discovering the value of the station. We decided that perhaps another type of evaluation would be of greater importance than a statistical one.

We asked each of the persons who had volunteered to work in the program what he thought about it. Did the home accident prevention material help teachers to teach children about safety? Were the pamphlets prepared by our health education division of assistance to pediatricians and physicians in teaching parents about accident prevention? We were asking for an honest evaluation, for an opinion, of the total project. The evaluations varied greatly, as each one considered the accomplishments from his own point of view.

We also evaluated the program by the requests that we had for literature. We have had requests to permit reprinting of our pamphlet on prevention of accidents in childhood from many private physicians and local and State health departments in the United States. I am sure that these reprints would now total well over a half million.

Integration With Regular Programs

On June 30, 1956, the 5-year program ended, and our home accident prevention activities were integrated into the regular activities of the health department. We have continued to record and code services in this field. We have continued to provide health education services wherever we can.

One cannot introduce a new health program to a hard-working staff without advising them of work priorities. This process means that something must be dropped. The activity that is dropped depends on the interest of staff workers as well as on that of supervisors and administrators. Consequently, inservice training is an important function if home accident prevention activities are to continue. Few schools of nursing or schools of public health emphasize adequately the need for accident prevention activities.

Recently, I asked some of our staff members to be specific about what they were doing in accident prevention. Some were spending a considerable amount of time on school safety, infant safety, or safety in the home. It was interesting to note that four nurses who had been employed in the last 3 months and had not completed their inservice training in this field were not nearly as aware of either the problem or the methods of teaching as the persons who had had experience during the home safety project. Each person must demonstrate to himself that accidents can be prevented and that they are important in public health whether a particular health department or voluntary agency recognizes it or not.

General Observations

In summary, I should like to offer a few generalizations in this matter of accident prevention.

Accidents occur because of an individual's relationship to his environment. During infancy the degree of protection must be extremely high. The wise parent gradually lessens this protection and gives the child more and more responsibility as he is able to accept it. The question that faces every parent is, how much protection should a child have at each age? How much protection should the community supply even to adults? Under normal circumstances an adult with reasonably normal behavior gets along fairly well until chronic disease or old age begins to lessen his physical ability to compete with the natural hazards of living. It is then necessary for him to be surrounded again with an increasing amount of protection until he may require complete protection before his death. Thus accident prevention becomes a study of growth and decay.

Accidents occur because of man's emotional reaction to his environment. Mental health problems today present the most difficult challenge for us in public health to assist large groups of people. The distraught, disorganized mother with many children and no assistance in supervising them is going to have more home accidents than the one with equanimity who can instill a feeling of independence and assurance in her offspring. The choleric individual will have more accidents than his equanimous neighbor.

Public health's problem is how to immunize the person whose reaction to his environment

may cause accidental injuries. In some individuals emotional imbalance is temporary; in others the usual behavior pattern is conducive to accidents. Both types need insight into their problems, and usually they require assistance in acquiring that insight.

Immunization for a person with normal behavior may consist of having an accident, then asking himself what he should do to prevent the next one, and finally taking reasonable, logical action as a result of his self-analysis. Unfortunately, many people who have numerous accidents do not take an analytical approach. Consequently, the epidemiologist must ask such people, "How did the accident happen?" "Why did it happen?" "What do you think you can do to keep it from happening again?"

It should be recognized that environmental factors can play a role in the causation of accidents. A slippery bathtub, a ragged carpet, an unlighted stairway, and many other things may contribute to an accidental injury. But it is always much easier to blame something or somebody than it is to look at ourselves and admit that we were at fault.

Because almost everybody has a few accidents each year, it is difficult for the health department to develop an effective accident prevention program. What we need is a way to concentrate our efforts on those families that are having the greatest number of accidents. Our problems are case finding and identification of the accident repeaters. We are engaged at present in a research project sponsored by the National Institutes of Health, Public Health Service, to devise a method by which a health department can find families who have a high incidence of home accidents.

With limited health department facilities, it is extremely important that the problem of case finding be solved. Until we have improved our skill in finding high-incidence families, our efforts will be as disseminated as were those against communicable diseases before the epidemiology of these diseases was established. Prevention of accidents depends on finding persons who are causing accidents to themselves and their families. With the problem thus identified, accident prevention will be within the capabilities of an average health department.

Gains in Industrial Safety

The loss of life in occupational accidents has decreased from 17,000 to little more than 14,000 a year in the last 15 years, according to the *Statistical Bulletin of the Metropolitan Life Insurance Co.* (October 1957).

Many industries have improved their safety records. The transportation industry provides a notable example. The occupational death rate for trainmen of all categories, as a group, dropped from 136.2 per 100,000 in 1939–41 to 47.3 in 1954–56.

In the past 15 years, workers in the petroleum industry have reduced by more than two-fifths their on-the-job accident fatality and permanent total disability rate. The rate for all departments combined dropped from 31.9 to 18.0 per 100,000 between 1939–41 and 1954–56. Part of the improvement is attributable to technological advances.

Similarly, in the chemical industry, the introduction of automatic machinery in many operations has apparently lessened the exposure of workers to accident hazards and toxic materials. The chemical companies show a drop of nearly three-fourths in the rate of fatalities and permanent total disabilities during the years under review.

Several of the more hazardous industries have likewise made noteworthy progress in lowering fatal accident rates. The accident death rate among coal miners has decreased from 230.6 to 166.7 per 100,000 in the last 15 years. The lumber and electrical industries appear to have reduced their fatal injury rate by approximately one-third during the same period.

Much more remains to be accomplished, particularly in industries which have lagged behind in promoting safety programs. In addition to the 14,000 lives taken annually, 2 million workers are injured in accidents arising out of and in the course of employment.

TRAINING PROGRAMS for Milk Plant Operators

NICHOLAS A. MILONE, M.S.

EMPHASIS has been and is placed on the need, value, and methods of instruction of food handlers other than those concerned with milk processing. If the published literature is used as the criterion, however, not much has been done regarding the education, training, and motivation of milk plant operators and owners.

Several reasons may account for the general lack of training programs for milk plant operators. The chief reason appears to be a current trend toward considering the sanitary objectives of milk control as a *fait accompli*. Tending to negate this assumption are some recent findings. Among these are a recent paratyphoid B milkborne outbreak incriminating pasteurized milk, equipment controls, and the human factor (*1*); laboratory thermal resistance studies indicating that heating *Coxiella burnetii* suspended in whole raw milk for 30 minutes at 143° F. is insufficient to eliminate all viable rickettsiae, suggesting thereby the need for tighter supervision of the pasteurization process (*2*); newer developments in the design and operation of high-temperature, short-time pasteurizers (*3*); the necessity for additional thermal resistance data on "no hold" and similar high temperature processes (*4*); and the closely associated need for the development and redesign of automatic time-temperature controls adapted to the demand of newer processes for quick response.

In addition, the New York State Department of Health recently compiled data to explain the causes for underpasteurization, which had been averaging 1.15 percent in New York State since 1949 (*5*). This department attributed the causes to (*a*) delegation of responsibility for pasteurization to unqualified relief operators, (*b*) change of management, (*c*) labor turnover, (*d*) moral and mental deficiencies of the operator, and (*e*) carelessness. Experience has shown that the human element may be considered the most important stumbling block to sanitary needs.

Nor should a casual statement to the effect that many more or less important intentional and unintentional violations of local, State, and Federal sanitary code regulations take

Mr. Milone for the past 8 years has been a resident lecturer in environmental health at the School of Public Health, University of Michigan, Ann Arbor. From July 1930 until June 1949 he was a sanitarian and bacteriologist for the New York State Department of Health.

place daily in many plants cause eyebrow raising among the initiated. In fact, considering the complexity of the modern pasteurizing process it would be surprising if such were not the case. From this standpoint, one cannot escape the strong suspicion that some potential outbreaks are avoided by the now common practice of overpasteurization.

Although there is considerable justification for holding management responsible for the proper operation of plants, health agencies cannot and should not miss the opportunity of promoting the spread of information as to the causes, nature, and prevention of prevalent diseases and the preservation and improvement of health. Certainly most will agree that relying solely on the punitive approach leaves much to be desired.

There is little doubt that existing defects in equipment and operation in milk plants may be attributed to some lack of training, education, and motivation. In an attempt to fill this need, the writer, with the cooperation of the health jurisdiction and milk dealers concerned, presented training programs in applied dairy and sanitary science to the plant owners, managers, operators, and personnel of Washtenaw County (March 13 to May 1, 1956) and Calhoun County (October 12 to November 16, 1956) in the State of Michigan. The 6-week course in Calhoun County was essentially the same as the Washtenaw County 8-week course with the exception of minor details.

Our experience, tailored to suit particular needs, may serve as a guide for other control agencies and dealers interested in the cooperative development of similar courses.

Preliminary Actions

At the initial meeting, the milk dealers were represented by owners and managers and the local health department by the public health engineer, educator, and sanitarians. We decided to hold the meetings each Tuesday evening at the Ann Arbor and Marshall Court Houses from 7:30 to 9:30 p. m. for 8 and 6 weeks. All plant personnel were invited to attend on a voluntary basis since they would be contributing their own time. The dealers agreed to bear the bulk of the expense. The course was designated "Applied Sanitary and Dairy Science," the term "dairy" being used to indicate that the instruction would not be confined to sanitation.

A public health educator was assigned the task of publicizing the program by means of newspaper, radio, and television. The dealers reacted favorably to this aspect of the program, believing it demonstrated the dealer's concern for the consumer's welfare.

Objectives of the Course

Main objectives of the course encompassed the following:

1. To familiarize the trainees with the properties of milk and milk products and the various environmental hazards that may affect quality and safety during the production, processing, storage, and transportation stages.
2. To interpret for the participants the intent and applications of sanitary regulations as exemplified by the Ordinance and Code of the Public Health Service.
3. To inculcate in the trainee desirable mental habits relating to contamination potential of product, equipment and operation, product quality and safety, cleaning and sanitization, plant layout and product flow, and liability and responsibility.

A list of the subjects presented in the course is given on page 56.

The necessary motivation was supplied by continually pinpointing the relationship between quality and economics.

Presentation of Subject Matter

Throughout all sessions it was of utmost importance to present the subject material effectively and to establish the critical awareness desired. All the material is amenable to an interesting approach if properly planned, prepared, and executed. The use of visual aids prepared by the instructor plus judicial selection of available aids helped enormously in making the program a success. For these reasons a few of the devices developed and used will be described. To help attain and maintain a high level of interest, many references to experiences were made, some of a humorous, many of a practical, nature.

General subjects presented during the training sessions

Basic fundamentals

Science of milk production
Nutritive properties
Microbiology Disease and quality
Performance and quality

Receiving of milk

Deck tests Receiving equipment
Clarifiers Filters Separators Milk waste
Milk transportation Bulk tanks

Heaters and coolers

Exchange equipment Homogenizers
Pasteurizing equipment Pumps
Bottle fillers and cappers
Temperature and time controllers
Construction, design, and operation
Inspection and maintenance

Sanitizing equipment

Bottles, cans, and equipment
Bottle and can washers
Water, detergents, and sanitizers
Tests for determining efficiency

Sanitary quality control

Laboratory tests Trouble shooting

Defects in market milk and cream

Causes Solutions Routemen and quality

Plant layout, design, and utilization

Product flow
Building and building facilities

Legal aspects for the dealer

Liabilities Responsibilities

[Detailed descriptions of course content and the methods and materials used may be obtained upon request from the author. An instructor's guide containing lecture notes and use of materials is in preparation.]

At the start of the first session, a bottle of milk was placed on the table in front of the instructor. After remarking on the simple appearance of the liquid and how easily it could be simulated by suspending some bolt chalk in water, he projected on the screen a chart showing in detail the components of milk. This action served as a dramatic means of impressing the audience with the great complexity of the product they worked with daily.

A nontechnical movie, The Science of Milk Production, sponsored by the Purina Company of St. Louis and made in cooperation with the University of Minnesota, was then shown clearly illustrating how the cow makes milk. The motion picture was very effective and maintained maximum interest throughout its presentation.

One of the main aims of the training program was to make the trainee "contamination conscious." A series of placards was especially prepared to fulfill this course requirement. The placards described and illustrated the intimate life of a microbe, the decomposition of an apple, and the decomposition of a dead cat (*6*).

In the first of these, pertinent references were made to the ubiquitousness of microbes, their never ceasing activities, the absence of a temperature regulatory system illustrating an important fact which makes refrigeration possible, the factors limiting growth, their small size, enormous numbers, amazing appetites, astonishing variety of diets, rapid multiplication under favorable conditions, and finally the fortunate fact that the majority of micro-organisms are not only innocuous to humans but are actually helpful and necessary.

The sequence on the decomposition of an apple traced the organic breakdown of an apple from the moment it falls from a tree to its ultimate decomposition by soil bacteria.

The last sequence, the decomposition of a dead animal, detailed in nontechnical terms the decay and final disintegration of the animal body.

Petri dishes containing sterile nutrient agar were then passed around, and the trainees were asked to talk, expectorate, sneeze, and cough over the exposed medium. One participant was asked to draw his finger over the surface of the agar and another to place a hair on the surface. Following incubation the resulting cultures were projected on a screen and discussed.

At this point it can be stated without equivocation that the trainees had been made, in varying degrees, "contamination conscious." A few

judicious and qualifying remarks avoided establishing a microbiophobic turn of mind. Ever present was the temptation for the instructor to go overboard in making a point and thus do more harm than good. The other procedures used to obtain the desired mental habits were presented in a similar manner.

Public Health Service slides (*7*) and motion pictures (*8*), illustrating lecture material, emphasized construction, design, and operation in nontechnical terms.

The subject of sanitary quality was explored by demonstrating the tests commonly used to measure quality, together with interpretation of results. Methods of overcoming causes of unsatisfactory results were discussed in detail.

At the conclusion of this session a chart containing, anonymously, the yearly performance data of each participating dealer was projected on the screen. By this means, it could be effectively demonstrated that unsatisfactory results could be overcome by efficient performance.

The demonstrative method was used almost exclusively during the washing and sanitizing session which included a discussion of the advantages and defects of common methods.

The plant session covered building, lighting, ventilation, product flow, and many other aspects that tend to make the plant more efficient and economical to operate. Examples were given of legal implications, and the responsibility of the dealer to consumers was stressed.

The session on defects in market milk and cream covered causes and means of overcoming the defects. Concrete and factual examples explained sanitary code regulations.

At the last session of the program a succinct summary touched on the major points of the course, with some emphasis on the economic phases.

Audience Reaction

Previous experience had indicated that dealers would be hesitant to ask questions during the question period held at the conclusion of each session, believing that such an action might reveal vulnerabilities to competitors. For this reason, a question box was used for depositing unsigned questions which were discussed at the following session. Another means employed was the use of a health department representative to ask leading questions.

From observations made throughout the program, and from those obtained at the conclusion of the course from an interview with the participants, the following information was elicited:

- Dealer reaction was very favorable.
- Most of the plant personnel attended all of the sessions. This was as gratifying as it was surprising especially in view of the voluntary attendance arrangements. As a consequence the audience as a whole gained a general knowledge of the contents of the course while the specialized crews benefited from the specific instruction directed to them.
- The session on defects in market milk and cream was the most popular, a reflection of one of the main interests of the dealers. Since quality and safety are closely related, this attitude cannot be considered a drawback to the main objective of the program.
- There were strong indications that desired mental habits were instilled in the trainees.

Requests to present the program in other jurisdictions indicated that there is a market for these programs. It should be thoroughly exploited because of obviously inherent rewards. Qualified instructors for such programs are available in each health department and institution of learning.

Finally, it is considered wise to reemphasize that one of the most important prerequisites for success in the presentation of these programs is to make a continual bid for interest. This can only be accomplished by a vast amount of time, thought, effort, and initiative in planning, preparation, and presentation. Ingenuity will help considerably. The rewards, however, make it all worth while.

Critique

It may be felt that the subject matter presented within the allotted time was too extensive and intensive for maximum effectiveness, but our chief objective was to determine the need, value, and reception by industry of the training course. The general complexity of the subjects makes it mandatory to present them over periods consistent with the attainment of maximum effectiveness. Any jurisdiction presenting these programs that finds the suggested

course lengths unsuitable may adjust the time factor to its particular needs.

An important consideration for evaluative purposes is the fact that one such program is not sufficient to the needs of the participants. Milk technology is in a dynamic state and progress is being made daily in all its phases. Progress should by all means be communicated to the industry, and the most satisfactory means of accomplishing this is by the routine and continual offering of training programs, properly spaced so as to accommodate new material as it becomes available.

Accordingly, these programs should result in material gain for the processor, and, in conjunction with its inspection and laboratory programs, the control agency should obtain benefits not otherwise realizable. The consumer, for whom all this work is done, would profit in the greater protection which this means of communication achieves.

Summary and Conclusion

Contrary to popular conception a challenge still exists in the dairy field and will persist for some time to come. New processes and new developments continue to evolve and with them new problems requiring solution.

Trial training courses were conducted for milk plant operators in Washtenaw and Calhoun Counties in Michigan to evaluate the need, value, and reception of such training. The course subjects ranged from basic fundamentals in milk processing to legal aspects for milk dealers.

The results indicated that such programs on a continuing, routine basis would definitely aid and be appreciated by the industry. The responsible agency and the public would profit in the greater likelihood of a high quality, safe product.

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Helping the Housewife Prevent Accidents In the Home

A. L. CHAPMAN, M.D.

DURING 1956 about 28,000 people died from the effects of home accidents, and accidents of all types were the primary cause of death in all age groups from 1 to 35 years.

In comparison with the community reaction evoked by heart disease, cancer, poliomyelitis, and mental illness, the community reaction to accidents has been conspicuously weak. With the exception of the National Safety Council, some State and local safety councils, and a small number of pioneering State and local public health officials, few agencies have given accident prevention the emphasis it warrants. Perhaps a feeling of helplessness has fostered this lack of emphasis, but with the growing acceptance of the fact that at least 80 percent of accidents are caused by what people do or by what they fail to do, public health workers are in a better position to exert leadership in accident prevention.

Since they stem from the actions of people, accidents can be made the subject of study, analysis, and prevention in the same way that human factors involved in the susceptibility of humans to disease have been studied.

The magnitude of the research effort that will be needed to develop scientific data of sufficient quality and quantity to support scientifically valid efforts to control accidents will be great—no smaller, certainly, than the magnitude of the research effort now being made to determine the causes and means of preventing cancer, heart disease, and mental illness. Meanwhile, much can be done on an empirical basis to accelerate the present slow but steady decline in accident rates.

There is presumptive evidence, at least, that intensive as well as extensive efforts to organize communitywide education programs can contribute to a marked decline in the number of deaths and injuries resulting from home accidents.

Dr. Chapman is chief, Division of Special Health Services, Bureau of State Services, Public Health Service.

Group Conferences

Since face-to-face, person-to-person communication is more apt to motivate people to act than communication using the printed word alone, the usefulness of the group conference technique is suggested.

Several reasons may be cited for limiting the use of the conference technique to housewives during the early stages of the development of a local accident prevention program:

1. Experience with the group conference technique has indicated that housewives are more conscientious in attending conferences than men.

2. Although many mothers now work, the great majority still remain at home during the day. As housewives they play a "guardian" role with respect to the children in the household and to oldsters as well.

3. The maternal instinct can serve as a source of motivation to influence the mother to attend group conferences on accident prevention and to apply the lessons learned there.

4. Group conferences can be fitted nicely into the framework of orthodox public health operations in most communities since many public health nurses already are skilled in group conference techniques. Public health nurses are accustomed to working with mothers.

Booklets on Accident Prevention

The Division of Special Health Services of the Public Health Service has available two booklets that can be used in conducting local group conferences in home accident prevention. These booklets will be released through the regional offices of the Department of Health, Education, and Welfare to State health departments for final distribution to local health departments.

The first booklet, entitled "One Way to Develop Local Home Accident Prevention Activities," describes the development of these activi-

ties. Four stages are suggested for introducing to public health workers or to housewives the principles and techniques that are important in the prevention of home accidents. Stage 1 provides for a series of weekly conferences at which subject matter contained in the second booklet may be discussed; stage 2 describes methods by which local resources may be identified; stage 3 gives three methods for determining the extent of the local home accident problem; and stage 4 lists eight typical activities that may be engaged in locally to provide experience and seasoning.

The second booklet, entitled "Home Accident Prevention Text," presents a digest of principles and techniques important in developing home accident prevention activities. Sixteen chapters describe the accident prevention problem, the various factors which contribute to accidents, and the roles that can be played by public health workers and physicians.

The guide and the text can provide local health officers with a useful digest of current material on home accidents, plus an organized method of presenting it to members of their staffs and then, through group conferences, to key persons in the community. Both booklets may be used to orient housewives to the problem of home accidents and to methods of preventing them.

The task of involving thousands of professional public health workers and millions of citizens in an all-out attack on accidents is a tremendous one. It can only be accomplished by attacking the problem simultaneously on many fronts.

Potential Anticancer Compounds

New, potential anticancer compounds will be produced by six research organizations under contract with the Public Health Service. The chemicals to be synthesized under these contracts are designed to interfere with the growth of cancer cells in various ways.

One group of compounds, known as antimetabolites, inhibits the growth of cancer cells by blocking certain metabolic reactions. These compounds bear enough resemblance to needed chemicals to be accepted by the cells, but they also differ enough to interfere with the cells' metabolic processes of self-repair and self-reproduction.

Laboratory tests have shown that when cancer cells use certain antimetabolites, cell repairs are faulty and the cells either fail to grow and multiply or they die.

Synthesis of hormonal substances constitutes another promising avenue of cancer research. Both male and female sex hormones hinder the growth of cancer cells by changing the hormone environment which the cells need to continue reproducing.

The chemicals to be synthesized by the six research organizations will be tested against three types of animal tumors. Any of the hormonal substances that show promise will be used in clinical studies which hospitals throughout the country are conducting in cooperation with the National Cancer Institute, Public Health Service.

Stanford Research Institute, Menlo Park, Calif.; Southern Research Institute, Birmingham, Ala.; Medical College of Virginia, Richmond; and Monadnock Research Institute, Inc., Antrim, N. H., will prepare various kinds of antimetabolites for evaluation as anticancer drugs. The Upjohn Co., Kalamazoo, Mich., and the University of Chicago will produce new hormonal substances in quantities sufficient for laboratory studies and clinical trials.

The six contracts involve an expenditure of approximately $793,000 and will be administered by the NCI Cancer Chemotherapy National Service Center.

Communitywide Pregnancy Reporting in Kauai, Hawaii

FERN E. FRENCH, M.A., LOUISA P. HOWE, Ph.D., JESSIE M. BIERMAN, M.D., ANGIE CONNOR, M.D., and DOROTHY H. KEMP, M.D.

A STUDY envisioned in 1953 by Yerushalmy and Bierman starts not with the birth, or the fetal death, but rather with the pregnant woman from the time she becomes aware that she is pregnant (*1*). Such a longitudinal study entails observation over a period of time of all women in a community who are known to be pregnant. Fetal deaths can therefore be studied not as isolated instances but as part of all the pregnancies in the group. The study on the island of Kauai, Territory of Hawaii, was planned along these lines.

In 1952, the Department of Health, Territory of Hawaii, and the University of California School of Public Health joined efforts in the countrywide Kauai project, designed to study the outcome of all pregnancies in the community and to learn as much as possible about the factors associated with that outcome. The basic methodology involves periodic investigations made from early in pregnancy through termination in live birth or fetal death and continuing with surviving infants for at least a year.

Thus, unfavorable outcomes can be studied not as isolated instances but as part of all the pregnancies in the group. By following each pregnancy throughout its course and the infant for a period of time, it is possible to study physical and mental abnormalities related to prenatal or natal influences, as well as the social and economic factors involved.

An initial phase of the study used material obtained through a census carried out in 1953 to evaluate the usefulness and limitations of retrospective studies of pregnancy. Retrospective data gathered in this way, shown to be reliable for women under 50 years of age, have provided refined knowledge concerning familial tendency to three components of pregnancy loss: early fetal, late fetal and neonatal, and postneonatal fatalities (*2*). The second phase had the objective of determining the feasibility of communitywide pregnancy reporting with the size and type of staff and organization used in the study. The collection of adequate material would result in meaningful rates of fetal death, by period of gestation. At the end of the longitudinal study in 1958,

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Miss French is completing work for a doctorate in public health at the University of California School of Public Health, Berkeley. Dr. Howe, resident research director of the Kauai Pregnancy Study, and Dr. Bierman are respectively associate research sociologist and professor of maternal and child health at the same school. Dr. Connor is chief of the bureau of maternal and child health and crippled children's services and Dr. Kemp is director of hospital and medical care, Territory of Hawaii Department of Health, Honolulu.

This is the second report in a series entitled "Longitudinal Studies of Pregnancy on the Island of Kauai, T. H.," financed by the Children's Bureau and conducted jointly by the School of Public Health of the University of California and the Territorial Health Department. This paper was presented in basically the same form during sessions of the 84th annual meeting of the American Public Health Association, Atlantic City, N. J., November 12, 1956.

reports will be made on these fetal loss rates and on any associations between factors in the environment of the fetus and newborn and the outcome of pregnancy.

We present here the setting of the study, our experience thus far in communitywide reporting of pregnancies, and data accumulated during the 2½ years ending June 1956. It is hoped that this part of the study, which is comprehensive rather than intensive, will answer a few questions and produce clues for other research by more intensive or perhaps different means.

Setting of the Study

The island of Kauai lies at the northwest end of the Hawaiian chain, some 100 miles from Honolulu. Although three-fourths of the 30,000 inhabitants were born in Hawaii, the population is ethnically variegated. The population pattern shows Japanese (44 percent), Filipino (25 percent), Caucasian (14 percent), part-Hawaiian (11 percent), and a sprinkling of Chinese, Koreans, and Hawaiians. The people live in small towns and plantation camps that are scattered around the shoreline, while the mountainous and often rainy central part of the island is mostly uninhabited.

Agriculture is the principal "industry," the skills it requires increasingly approaching those of a large-scale industrial enterprise. Sugar cultivation goes on all year around, while pineapple harvesting and processing reach a peak in the summer, when a large number of women are employed in the canneries. Rates of pay are comparatively high in these two fields, but employment opportunities are distinctly limited, and other jobs pay poorly. The cost of living is high except for clothes and housing, of which not much is required because of consistently mild weather.

Since 1950 the size of the population has remained fairly constant, but the emigration of many of each year's high school graduates has left a disproportionate number of children and of older men, the latter mostly Filipinos brought in to work on the plantations. In 1950 nearly half of Kauai's dwellings were plantation houses, but since then there has been a notable increase in private home building. Running water is practically universal, and only a few small districts lack electricity.

Excellent provision is made for health and medical care. There are 13 physicians on the island, 7 associated with the plantations and 2 serving as government physicians. Virtually all plantation employees and their families are enrolled in plantation medical care and hospitalization plans, and the Hawaii Medical Service Association, patterned after the Blue Shield-Blue Cross organization, currently has a Kauai membership of more than 5,000.

Hawaii's health department, one of the oldest in the United States, has had a notable record of achievement in the face of extraordinary problems. For example, it is said that none of the babies born in 1848 survived. Thirty years ago Hawaii's infant mortality rate far exceeded that of continental United States; now it is one of the lowest in the country, with 21 infant deaths per 1,000 live births in 1955. Kauai's rate was a little lower than that of the Territory as a whole.

The search for a place where a communitywide survey of fetal waste and a study of reproductive pathology could be carried out with some hope of success led to the selection of Kauai. The population is relatively stable; people live close to one another and are concerned with each other's welfare; babies are highly prized, and virtually all of them are born in hospitals. A high standard of medical care is maintained and is available to all, and excellent cooperation with health programs has been achieved in the past. It seemed likely, therefore, that such a research project might be given widespread cooperation by the physicians and by the population as a whole.

The Census

After a trial run in the summer of 1952, the first phase of the study got under way in February 1953. Six interviewers resident in Hawaii, 5 nurses and 1 social worker, set about obtaining a census. They listed the occupants of each house and recorded household information and brief personal data, including a reproductive history of all women 12 years of age or older. All apparent prospects were asked if they were then pregnant; if so, the date of the

reported last menstrual period was recorded. A pregnancy report card with a postage-free envelope was left with each woman, and she was requested to mail it to the health department as soon as she believed she was pregnant.

Local physicians were asked to submit each month a list of the mothers who had come to them for prenatal care. During later months, the physicians were supplied with special forms serving, among other purposes, as a source of pregnancy reports to the study. These were used by some physicians.

By September 1953, the enumeration was finished and data necessary for the retrospective phase of the study were at hand. Since then an attempt has been made to obtain similar information on new residents and to record the departure of persons who had been enumerated in the original census.

Campaign for Early Reports

In this study the earliest possible reports of pregnancy are those made by women after their first missed menstrual period. A drive for such early reports of pregnancy began in October 1953. In this same month, 2 public health nurses were added to the regular staff of the health department, regular reports of new pregnancies began to come in from some of the physicians, and newspaper articles about the study appeared in the weekly paper. A series of mother and baby care classes was planned by the health department, and nurses went from door to door asking mothers if they or their friends or neighbors would be interested in such classes—and if they were pregnant. Visits were made to newly wed couples, and talks were given to women's groups and church gatherings.

In the spring of 1954, an all-out drive to publicize the study got under way. Three local community organizers visited women and talked to small groups in various parts of the island, and a reporter's services were engaged for help with newspaper releases. Leaders in the community were brought together for a meeting at which the study was explained, and letters were mailed to all prospectively pregnant women, urging them to see their physicians early and to return an enclosed pregnancy report card when they became pregnant. At meetings of the county medical society, the continued help of the physicians was solicited. As a crowning touch, milk bottles delivered around the island one day were bedecked with a printed message urging mothers to cooperate with the pregnancy study. As a result of these efforts more reports came to the study in 1 month than had ever been received before.

The job of finding new pregnancies continued with radio talks, speakers for various groups, slides shown in the theaters, posters, and mimeographed throwaways. In August 1954 and in January 1955, letters were sent to the pregnancy prospect list, thanking them for their past cooperation and enclosing a report card and envelope once again. In early 1955, the resident research director arrived, and during the next 6 months there was a gradual crescendo of activity. Starting in September, the health department laboratory, from which prenatal serology was ordered by the physicians, became an additional source of reports for pregnancies known to the physicians but not yet reported to the study. The next letter sent to the mothers at the end of 1955 took the form of a calendar with a report card. The campaign for early reporting continued until the end of 1956, when the number of pregnancies for followup was considered adequate.

Periodic Interviewing

Simultaneous with the drive for early reporting was the periodic interviewing of all reported pregnant women during their pregnancy. This activity began in May of 1954. Women identified early were interviewed three times during pregnancy; others twice or only once.

For this part of the study, 2 full-time and 4 part-time interviewers were added to the staff since the load was too heavy for the health department nurses to carry in addition to their regular duties. The project also had the assistance of two office clerks.

In early 1956, the first group of babies born to mothers who had been interviewed during their pregnancy were given pediatric and psychological examinations, procedures heartily welcomed by the mothers. Periodic inter-

viewing is scheduled for completion at the end of 1958.

Resulting Pregnancy Reports

Although some reports of pregnancy were received during the time the population was being enumerated, there was no attempt to obtain early reports until after the census. Since this paper deals with what was done to obtain reports early in pregnancy, analysis is limited to pregnancies with reported last menstrual period (LMP), beginning in 1954. LMP indicates the beginning of the last menstrual period. Weeks of gestation refers to weeks since LMP. Although the date of conception is usually fixed 10 to 14 days after the beginning of the last menstruation (*3*), conception is used synonymously with LMP here.

In addition to equalizing monthly periods, the lunar month, or 4-week period, has other advantages in keeping track of the week and lunar month of occurrence of many events involved in this kind of study. The first 7-day period in 1953 was called the first week and each succeeding week was given its appropriate number. As a result, intervals between various reports are determined easily. For example, if a first report of pregnancy was made on May 5, 1955, the 70th week, and the reported LMP was December 16, 1954, the 50th week, the interval from LMP to first report was 20 weeks. Groups of 4-week periods were designated as lunar month 1 through 13 for each year. This was particularly useful in comparing lunar months from LMP to first report with lunar months from LMP to first visit to physician or to termination of pregnancy.

Since each report of pregnancy was related back to the lunar month of reported LMP, for any particular month, after 40 weeks or so have elapsed, we accumulate the total cohort with reported LMP in that month. Some are reported soon after the LMP and some are not known until several months later; in fact, full-term pregnancies missed until delivery are not added to the cohort until approximately 10 lunar months after LMP. This procedure means a timelag, of course; cohorts for the first months of 1956 had not been followed completely by the cutoff date of June 30, and, for this reason, figures 1 and 2 are carried through 1955 only. Cohorts with LMP in late 1955 may be slightly increased with very late reports coming in after June 30, 1956.

Such an allocation has definite advantages in this type of study. During each month there are a certain number of early pregnancies which are available for reporting. By looking at the total cohort, the percentage which was reported, for example, under 12 or 16 weeks' gestation can be determined for each month and results evaluated. After some experience in a community under study, the seasonal pattern of monthly cohorts and the percentage of early reports can be estimated without waiting for the total cohort to accumulate.

The success of the drive for early reporting in the late spring of 1954 and the drop in reports during pineapple-canning season each summer are particularly evident in figure 1. The solid line in this figure indicates the result of allocating each report to the month of reported LMP. As would be expected, fluctuations are less extreme than for reports by month received. With only 2 years for study, generalizations with regard to seasonal variation are not warranted. However, winter and spring months show a somewhat larger number of conceptions than do the summer months.

In table 1 and figure 2 we observe that about 40 percent of all first reports were for pregnancies with gestation period under 12 weeks and 75 percent under 20 weeks, while 90 percent were for those under 28 weeks. The percentage

Figure 1. Month pregnancy report received by study and month of LMP, 1954 and 1955.

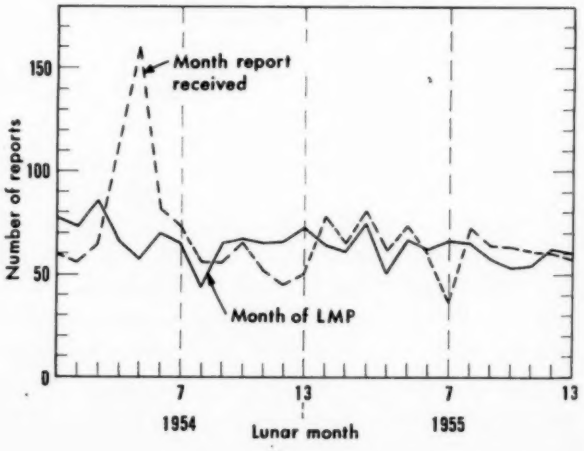
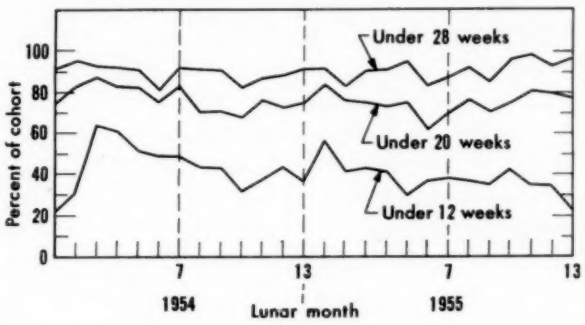


Figure 2. Percentage of monthly cohorts of conceptions reported to study by weeks, since LMP, 1954 and 1955.



of reports under 20 weeks was about the same for the 2 years, but the yield of earlier reports was not so large in the second year.

Source of Reports

Notification of many pregnancies were received from more than one of the following sources: the mother, the physician or his records, interviewer's activities, reports of laboratory serology tests, or social agencies. First reports are analyzed here in order to eliminate duplication.

Although most women presumably knew of the study and had pregnancy report forms available through periodic mailings and therefore could have reported their first missed menstrual period in the 4–7-week period of gestation, only about 20 percent of first reports came directly from them. In spite of publicity that unceasingly stressed early reporting, some mothers were surprised that the study should want to know about them before they were absolutely sure they were pregnant. Indeed, it may be that the study's success in gaining acceptance by the community militated against early reporting by the mothers themselves. Some, when asked why they didn't notify the study immediately after they realized they were pregnant, answered that they knew the interviewer would be around sooner or later anyhow, so what was the need?

However, first reports sent in by mothers themselves were by far the earliest: more than 20 percent were for pregnancies under 8 weeks' gestation compared with 14.4 percent from study interviewers and 5.9 percent from physicians' records (table 2). Almost 90 percent of first reports from mothers were made before the 20th week compared with about 80 percent for interviewers and 70 percent for physicians' records.

Table 1. Percentage of monthly cohorts of conceptions reported to study, by weeks of gestation, according to lunar month of reported LMP

Lunar month	1954				1955			
	Monthly cohort	Percent of monthly cohort by weeks from LMP to first report			Monthly cohort	Percent of monthly cohort by weeks from LMP to first report		
		Under 12	Under 20	Under 28		Under 12	Under 20	Under 28
1	77	22.1	75.3	90.9	64	57.1	84.1	92.0
2	73	31.5	83.6	95.9	61	41.7	76.7	83.3
3	86	63.6	87.5	93.2	75	43.2	75.7	90.5
4	66	60.6	83.3	92.4	50	40.8	73.5	91.8
5	57	50.9	82.5	91.2	67	30.3	75.8	95.5
6	70	48.6	75.7	81.4	62	37.7	62.3	83.6
7	65	49.2	83.1	92.3	66	38.5	70.8	87.7
8	44	43.2	70.5	91.0	65	37.5	76.6	92.2
9	65	43.1	70.0	90.8	57	35.7	71.4	85.7
10	67	31.3	68.7	82.1	53	42.3	75.0	96.2
11	65	36.9	76.9	87.7	54	35.8	81.1	98.1
12	66	43.9	72.7	89.4	62	35.5	80.6	93.5
13	73	38.4	75.3	91.8	60	23.3	78.3	96.7
Total	874	43.4	77.7	90.1	796	38.5	75.5	91.2

LMP=Last menstrual period.

Table 2. Source of first reports of pregnancy by weeks from LMP to report to study, LMP January 1954–June 1956

Weeks from LMP to first report	Source of first report		
	From mother directly (percent)	From interviewers [1] (percent)	From doctors' records [2] (percent)
Under 8	22. 3	14. 4	5. 9
8–11	38. 2	34. 9	27. 7
12–15	20. 1	22. 1	22. 7
16–19	8. 6	12. 2	17. 1
20–27	7. 6	11. 2	18. 1
28 and over	3. 4	5. 3	8. 3
All periods:			
Percent	20. 6	28. 3	51. 2
Number	359	493	893

[1] Includes reports from health department nurses and 11 reports from social agencies.

[2] Includes reports from prenatal serology requests and those obtained by interviewers from doctor's records.

LMP=Last menstrual period.

NOTE: Limited to the 1,745 reports made prior to termination of pregnancy.

As it turned out, the largest number of first reports came from the office records of the physicians; these, however, were for more advanced pregnancies, on the average, than reports from other sources. Some physicians or their nurses sent in reports directly; others, however, preferred to have a member of the study staff copy the required information from their office records. Some pregnancies were missed altogether, and others did not come to our attention until some time after the first prenatal visit to the physician. Beginning in 1955, some pregnancies which were known to physicians but not yet reported were learned about through requests for prenatal serology. Another large group is credited to the initiative of the health department nurses and the study interviewers. For all first reports received prior to termination of pregnancy, the yield of these various sources was about 50 percent from physicians' records and prenatal serology requests, about 30 percent from interviewers, and 20 percent from mothers.

Physicians' Records

Although 50 percent of first reports had their source in physicians' records, the remaining 50 percent were not completely unknown to the physicians. In fact, the study's records show that only 6 percent of all reported pregnancies were without prenatal visits. There are, undoubtedly, some incompleteness and some inaccuracies in the study's records of first prenatal visits to physicians. For example, inconsistencies sometimes appear between the date of the first prenatal visit given on the physician's report form or in his records, and the date reported by women in their interviews. The latter date is sometimes earlier in pregnancy—some physicians probably record as the first

Table 3. Reported pregnancies by weeks from LMP to first recorded prenatal visit to doctor, and by weeks from LMP to first report to study, LMP January 1954–June 1956

Weeks from LMP to first prenatal visit to doctor	Weeks from LMP to first report to study						Report after termination	Total reports	
	Under 8	8–11	12–15	16–19	20+	Unknown		Number	Percent
Under 8	**86**	94	22	13	11	1	13	240	12. 9
8–11	34	**261**	87	33	17	0	29	461	24. 8
12–15	26	68	**178**	49	15	0	4	340	18. 3
16–19	18	35	36	**104**	26	0	1	220	11. 8
20+	9	39	37	33	**268**	0	19	405	21. 8
Unknown	12	29	12	9	12	**0**	5	79	4. 2
No visit to doctor	19	30	12	3	7	0	43	114	6. 1
All periods:									
Number	204	556	384	244	356	1	114	1, 859	
Percent	11. 0	29. 9	20. 7	13. 1	19. 2	0. 1	6. 1		100. 0

LMP=Last menstrual period.

visit the first which is made after the pregnancy is reasonably well confirmed. In this analysis, the earliest visit in the prenatal period is used.

The fact that all but a small percentage were known to physicians prior to delivery points up the potential value of their records as an exclusive source of reports. However, certain questions arise: Were more reported pregnancies unknown to the physicians than to the study? How early in pregnancy were the pregnancies known to the physicians as compared with total reports to the study?

Six percent, or 114 pregnancies, were not reported to the study until a fetal death or live birth occurred, and, by coincidence, the same number, 114, had no recorded prenatal visit to a physician; 4 percent, or 71, were known only to the study and another 4 percent only to the physicians; and 2 percent, or 43, were unknown to both during the prenatal period.

The percentage of total reports known to the physicians in each lunar month of gestation is almost the same as the percentage known to the study (table 3). Close to 50 percent were known to each in the same lunar month. Of the 71 known exclusively by the physicians, 27 percent had no prenatal visit until 20 weeks or more gestation; of the 71 known only to the study, only 10 percent were learned about that late. An analysis of reports by single weeks from reported LMP indicates that for the first 6 weeks of gestation, reports to the study were, on the average, about 1 week earlier than those to the physicians; for the 7th through the 13th weeks there was no difference; for reports coming to the study after the 13th week, prenatal visits to physicians averaged about 1 week earlier.

Comments

Although the longitudinal method used here has definite advantages over the retrospective approach and over studying isolated aspects of the total problem, it presents some difficulties. In a community the size of Kauai with some 5,700 women 15 to 45 years of age, 3 years are necessary to identify about 2,000 pregnant women. Arousing community interest to the high pitch apparently necessary for early reporting, primarily by the women themselves, is obviously a difficult task; and maintaining such interest over several years is even harder. However, in a community three times the size of Kauai, the early reporting period could probably be cut to 1 year. A shorter time span would certainly be an advantage, although finding a relatively stable and closely knit community of such size is not easy.

As has been pointed out, the earliest possible reports of pregnancy are those made by women after their first missed menstrual period. Although we did not consider it feasible in this setting, it would have been advantageous to have had confirmation of early reports through the provision of pregnancy tests. Furthermore, it is possible that the offering of such tests might stimulate very early reporting and add knowledge about pregnancy wastage during the earliest weeks after conception.

While the analysis of physicians' records as a potential source of pregnancy reports indicates that pregnancies, on the average, were known to physicians on Kauai almost as early in pregnancy as they were known to the study, it is necessary to bear in mind that in many communities, fewer than 94 percent of the pregnant women receive prenatal care. Our findings suggest that among the preliminaries for such a study is an investigation of the extent of prenatal care in the community and how early the care is sought. The custom of the women as well as physicians' policies regarding encouraging or discouraging early prenatal care will be important factors. Of course, the most critical point is the real assurance that all pregnancies, including those that are not yet confirmed, would be made known to the investigators without delay.

Summary

Besides the objective of utilizing data collected at a special census to evaluate the usefulness of retrospective studies of pregnancy, the principal aims of the longitudinal part of the study were to investigate the feasibility of communitywide reporting of pregnancies, to determine fetal loss rates by period of gestation, and to study associations between factors in the mother and the outcome of pregnancy.

A census of the 30,000 inhabitants of the island of Kauai was taken in 1953. The pres-

ent progress report on communitywide reporting of pregnancies deals with the identification, as early as possible after the first missed menstrual period of all women who became pregnant from the beginning of 1954. Periodic interviews of all such women identified and examinations of their babies began in the middle of 1954 and are still continuing.

The great variety of methods used to obtain early reporting of pregnancies included interviewing by regular public health nurses of the health department and by study staff, activities of community organizers, talks to community groups, newspaper articles, radio programs, letters to prospective mothers, and posters.

All reports of pregnancy are related to the month of reported last menstrual period, thereby allowing an analysis by monthly cohorts of conception. About 40 percent of all pregnancies were reported before the 12th week of gestation, 75 percent before the 20th week, and 90 percent before the 28th week.

First reports of pregnancies came directly from mothers in 20 percent of the cases, 30 percent came from interviewers, and 50 percent from physicians' records. Reports were earliest for those who reported least: 60 percent of first reports from mothers were under 12 weeks, 50 percent of the interviewers' reports were in this period, and 35 percent of those from physicians' records.

Although physicians' records yielded only 50 percent of first reports, 94 percent of the pregnant women on Kauai made at least one prenatal visit. A comparison between the time when physicians learned of the pregnancies and the time when first reports reached the study shows that physicians knew of the pregnancies almost as early as the study. Some 6 percent were known only to the study (mainly very early pregnancies resulting in early fetal deaths) and another 6 percent were known only to the physicians; 2 percent were unknown to both groups until after termination.

Creating and maintaining interest sufficient to get adequate reporting by the women themselves is an undertaking of no small magnitude. However, if a relatively stable population of larger size than Kauai could be found, the same number of pregnancies could be identified for followup in a shorter period, and community interest would not have to be maintained for such a long period of time.

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Reorganization in Michigan School of Public Health

The University of Michigan School of Public Health has set up a new department of industrial health and abolished the department of tropical diseases. This action was taken November 22, 1957. Personnel from the department of tropical diseases have been transferred to the department of epidemiology.

The change reflects a shift in emphasis in epidemiology since establishment of the school in 1941. Tropical diseases were of paramount importance then because of World War II. Now, industrial health has come to the fore with the advent of new plastics, pesticides, and other chemical products, and the interest in radiological health, air pollution, and other aspects of the industrial environment.

The Clinical Pathologist in RESEARCH

Selections from an address delivered by Harold L. Stewart, M.D., at the Joint Annual Meeting of the American Society of Clinical Pathologists and the College of American Pathologists, on October 3, 1957, in New Orleans.

PATHOLOGY may be defined as the study of disease, not merely the study of body fluids and of abnormal morphology. The pursuit of pathology, therefore, includes research and investigation. The clinical pathologist throughout his entire career in a hospital laboratory is asked to advise on and to participate in research problems, and to interpret the results of research done by others. During his board training the resident pathologist needs to familiarize himself with the methods of experimentation as well as with the broad principles of pathology. How can the clinical pathologist evaluate the results of research by others if he himself has had no instruction in research methods and no actual training or experience in

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The Ward Burdick award for 1957, given annually for outstanding service in pathology, has been presented to Dr. Harold L. Stewart, chief of pathology, National Cancer Institute, and chief of the Pathologic Anatomy Branch, Clinical Center, National Institutes of Health, Public Health Service. The presentation was made October 1, 1957, at the Joint Annual Meeting of the American Society of Clinical Pathologists and the College of American Pathologists in New Orleans.

Dr. Stewart, an authority on cancer of the gastrointestinal tract, has held office in medical societies including the International Academy of Pathology, the American Society for Experimental Pathology, and the Maryland and Washington, D. C., Societies of Pathologists. He has also been a delegate to a number of international cancer conferences.

The Ward Burdick award is given in honor of the Denver pathologist who founded the American Society of Clinical Pathologists. Dr. Burdick, who died in 1928, was noted for his medical organization work.

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the field? To expect this is to expect a man to be a successful clergyman without having studied theology.

THE PATHOLOGIST has independently led the way to many important discoveries. Witness the history of our knowledge of the function of the pituitary gland. It was Pierre Marie who, in 1896, discovered the role of the anterior lobe of this gland in acromegaly, and it was Benda who found growth to be related to the alpha cells. But this important finding was left for the biochemist and endocrinologist to exploit, chiefly because the pathologist was not skilled in other techniques. Pathology, it has been said, depends upon tools of other disciplines for its research. The pathologist of the recent past leaned heavily on bacteriology and immunology for problems in experimental pathology. Today, the experimental pathologist utilizes chemistry and physics in the study of molecular diseases and he will need to learn many techniques to equip himself to take advantage of the wealth of opportunities that he has for research.

It is safe to predict that in time all the lesions of human beings will have been studied by electron microscopy. Just as our knowledge of lesions first studied by the naked eye was enormously increased by study with the light microscope, so will our present knowledge of the histopathology of these lesions be expanded by the resolving powers of the electron microscope. No one is better qualified than the clinical pathologist to study pathological lesions by electron microscopy. He is not just a microscopist seeing particles whose significance he is unable to interpret but is one widely familiar with the morphology and biology of disease.

The "mitochondria" revealed by the electron microscope and the mitochondria isolated by the biochemist in differential centrifugation, which are hailed as something new and strange, were discovered in Leipzig by the pathologist Richard Altmann in 1890 and named in 1898 by the pathologist Benda, who studied them in pathological tissue. The pathologists gave this discovery of mitochondria at once to the biochemist and the cytologist, who believed them to possess and probably to produce most of the cytochrome oxidase and other respiratory enzymes of the cell. Little is known of these organoids in pathological tissue and nothing of their behavior in human tissue. The pathologist should now return to this important field after more than 50 years of neglect.

THE DISCOVERIES that cancer can be induced by X-rays, by tars, and by aromatic polycyclic hydrocarbons led to a great deal of work on carcinogenesis which during the 1940's and thereafter has waned. Today too few pathologists are trained in experimental carcinogenesis. The techniques are not difficult to master. The clinical pathologist already possesses the necessary basic knowledge, including the procedure for a careful autopsy. Almost the only other things he needs to know are the design of the experiments and the methods of preparation of the known or suspected carcinogens for their administration by different routes. . . .

THE FOOD on the American table today in a well-balanced diet of acceptable form may contain many synthetic additives. Some may be toxic and some even carcinogenic for laboratory animals, while other food additives utilized for years past have never been tested adequately for chronic toxicity and cancer-inducing activity. New food additives are being introduced at a rate that precludes careful toxicological testing unless the number of investigators in the field of carcinogenesis be considerably expanded. There is pressing need for experimental research in this field.

THE CHEMIST, the biologist, or the physicist who does research may know his own subject thoroughly, but usually knows nothing whatever about pathology. The pathologist, on the other hand, well trained in anatomical pathology and laboratory medicine, also knows a good deal about chemistry, biology, and physics. Some pathologists have majored in one or another of these subjects, and others hold the degrees of master or doctor of philosophy. This makes the pathologist an ideal collaborator

in research problems, the primary scope of which lies outside the field of pathology.

A number of research problems, the basis of which lies primarily in disciplines other than pathology, still require pathology for their interpretation and solution. Too often, the pathological material in such experiments is discarded without examination. Not long ago, I read the report of a long-term toxicological experiment involving more than 500 rats. The statement was made that the rats were necropsied and no tumors were found in either the control or the experimental animals. It would be virtually impossible not to find many tumors in 500 rats, 20 or more months of age, of any special strain or breed or randomly selected market rats. Of course, a tumor does not exist for the investigator who does not have the training to detect a tumor at necropsy. It is important, therefore, for pathologists to collaborate with experimentalists trained in other disciplines so that the pathological lesions are properly recognized and recorded.

WHAT are the characteristics of a research man? No prevailing characteristic to my knowledge marks a potential investigator, unless it be the possession of an innate drive to explore a new idea even against advice. Certainly, there is no average investigator. Research has been defined in part as finding things without being told. The investigator is able to correlate seemingly unrelated facts. He knows what constitutes proof. Young or old, he must be keen enough to observe his results no matter in what direction his experiment leads and to turn his mistakes to good purpose. The research worker himself is a worthy subject for research, and some day some enterprising student of psychology may determine and record the recipe of his composition.

The greatest caution should be exercised to avoid the discouragement of a young resident who proposes an experiment. The experiment may appear inconsequential and often wholly impractical, but I have found that it is unwise to ridicule any plan for an experiment. It happens ever so often that one of these seemingly inconsequential or impractical experiments leads to results of great importance. It was the usefulness of seemingly useless research knowledge that led Marconi to develop wireless telegraphy. The most important factors in research are a desire to do an experiment and the impatience to get to work on it. All else is subordinate. A proposed experiment is often condemned because it has been performed previously. One needs only recall that prior to the development of insulin therapy for diabetes by Banting and his associates, other investigators had studied the effects of ligation of the ducts of the pancreas. Yet it was Banting who finally extracted the active factor from the islets of Langerhans by using modifications no one had carried out successfully before. It is clear that even though an experiment may have been performed previously something new may be found upon repeating it.

The beginner in research is apprehensive lest he err in his first experiment. Inertia retards many aspiring scientists from taking their first steps in the field of research. One has to get on with the work and realize that mistakes are inevitable. They can, however, often be turned to profit and may lead to the solution not necessarily of the problem under investigation, but rather of another entirely different and often more important one. It does not matter much whether the resident discovers anything new or publishable. The experience gained will be sufficient reward. Those who direct programs of residency training have a responsibility to see to it that these fine minds are given the opportunity to bring their ideas and talents to bear on experimental problems. Finally, the young investigator should be warned that for a large part of the time he works in research he will be doing the hardest and most uninteresting kinds of work that may involve cleaning animal cages, washing glassware, and cleaning up after necropsies. He needs encouragement and consolation together with all the help that can be given him to lessen the onerous duties that constitute so much of research.

THE TRAINING of a pathologist in the modern aspects of service work in clinical pathology has reached a peak in the United States that is unsurpassed elsewhere in the world. However, his reading should not be

limited to factual textbook material. He should be encouraged to read some of the original speculations of the great thinkers in pathology and research. How many residents are advised to read Nicholson's provocative essays on the formation of tumors, or Rokitansky on the humoral theory of disease, or Virchow on cellular pathology? or indeed such classics as the autobiography of Sir Ronald Ross? . . . The training of a pathologist in tumor pathology emphasizes accurate diagnosis of the biopsy specimen—almost never speculation as to the possible causes of tumors.

The resident training program should provide (*a*) more time to think and philosophize; (*b*) more instruction in the design and execution of experiments and the interpretation and application of the results; (*c*) recommendations for reading original contributions to research; and (*d*) access to library facilities that are adequate for the needs of a research worker.

HOW does the admissions committee choose or reject a candidate for medicine, and what is the impact of his choice on research in pathology? It is, I am told, the aim of many admissions committees to select applicants on the basis of high grades in college and the possession of certain qualities . . . that somehow or other indicate that the selected individuals will become good practitioners of medicine. So far as I know, no admissions committee deliberately selects students for medical school who possess the qualities needed for research. Consider the influence on the admissions committee of an answer to a question that the candidate for medical school might be asked. The question may be: "Did you go to the football game last Saturday?" Suppose the reply is "I spent the afternoon in the library reading some early editions of Machiavelli's The Prince," or "I spent the afternoon in a cool, quiet saloon scheming to eliminate some stupid premedical courses." Are these the kinds of answers calculated to get oneself admitted to medical school? And yet one must admit these answers reflect both honesty and originality, two excellent qualities for an investigator.

Dr. Stewart's paper will appear in full in the American Journal of Clinical Pathology.

Health Research Facilities Grants

Expansion of the Nation's health research facilities by at least $120 million is under way as a result of grants awarded by the Public Health Service during the first 2 years of its 3-year grant program.

Financed by an appropriation of $30 million authorized for each year, the grants are allotted for construction and improvement of facilities devoted to research in the basic science areas on such diseases as cancer, heart disease, and mental illness. An amount equivalent to the grant, or more, is supplied by the participating institution.

Approval of 43 new grants totaling $3,698,452, in October 1957, completed allocation of the $60 million appropriated for fiscal years 1957 and 1958. Benefited in the latest action were 39 institutions in 22 States, the District of Columbia, and Hawaii.

Under the new program, grants are approved by the Surgeon General on the recommendation of the National Advisory Council on Health Research Facilities. A total of 251 grants have been made since the program's inception in June 1956.

Clinical, X-ray, and Serologic Changes With Histoplasma Infection

NORMAN W. ANDERSON, M.D., IRENE L. DOTO, M.A., and MICHAEL L. FURCOLOW, M.D.

ALTHOUGH considerable information about histoplasmosis has been accumulated since this fungus infection was first described in 1906, much still needs to be learned about the frequency and severity of the disease accompanying primary infection. Following the classic work of Smith and his colleagues on *Coccidioides* infection in personnel of the U. S. Army (*1*), it was decided that such personnel, with their available medical care and complete records, would be an ideal group for a study of histoplasmosis. Consequently, in 1953 a study was initiated at Fort Leavenworth, Kans., by the U. S. Army Hospital on the post and the Public Health Service. Children of Army personnel participated.

The study was undertaken to determine the spectrum of illness accompanying *Histoplasma* infection. This was accomplished by observation of the clinical, X-ray, and serologic changes which accompanied conversion of the skin test from negative to positive. Its basic plan was to find a large number of children with a negative reaction to the histoplasmin skin test, observe these children over a period of time, and retest them to determine the infection, or conversion, rate. Clinical, X-ray, and serologic changes could thus be observed in a group who became infected and in a much larger group who did not and who therefore would serve as controls. Other interesting epidemiological information concerning infection was also collected.

Colonel Anderson is commanding officer of the U. S. Army Hospital, Fort Leavenworth, Kans. Miss Doto is statistician, and Dr. Furcolow chief, Kansas City Field Station, Communicable Disease Center, Public Health Service, University of Kansas Medical Center.

Col. R. M. Patterson and Lt. Col. Francis W. Lanard assisted in the supervision of the study; Capt. Sumner Hoffman and 1st Lt. Sheldon Kessler in the testing, and Maj. R. V. McAllister in the X-ray interpretation. David Sachs and Peter Ney assisted in the statistical analysis.

Material and Method

Fort Leavenworth, in northeastern Kansas about 30 miles from Kansas City, is the seat of the Command and General Staff College of the Army. The vast majority of the men stationed at this post are officer students of the school, arriving in August each year and departing the following June. These officers and their families have already had several years of Army life before coming to the post, including residence in all parts of the country and overseas. The children of these families formed the bulk of the children included in this study. Most of the remainder, but less than 10 percent of the total population tested, were children of the permanent personnel of the post living in the city of Leavenworth.

A preschool physical examination of all children is conducted routinely by the Army medical staff each August and September when the new families arrive on the post. In May of each year a smaller roundup is held for children who have arrived on the post or in the area later in the school year. These two examina-

tion periods provided an opportunity for at least two tests of a large number of children, with a suitable observation period between.

For the histoplasmosis study, September 1953 through May 1955, skin tests with histoplasmin were given along with the routine tuberculin and Schick tests. All children present at the examination received the skin test. They ranged in age from 5 through 18 years.

In the fall of 1953 approximately 1,500 children were skin tested for histoplasmosis, and the following May those whose initial tests were negative were retested. Also in May, 50 more children were added to the study. In the fall of 1954 the 600 histoplasmin negative children who were still on the post from the previous year were retested, and 1,300 new arrivals received their first test. Those retested included the negatives among the 50 added in May, who were being retested for the first time, and continuously negative children, who were being retested a second time. The histoplasmin negatives among these 1,900 children were retested in May 1955. A total of 2,872 children were included in the study.

The histoplasmin used was lot HKC–5 diluted 2:1,000. This potency is equivalent to that of standard histoplasmin. The tests were all given intradermally in the right arm, and readings were made at 48 hours with measurement of the erythema and induration. An induration of 5 mm. or more at the 48-hour reading was considered a positive reaction. Children whose skin tests changed from negative to positive during the interval between the two examinations were converters. Those whose tests remained negative and those with positive reactions on the first test served as controls.

At the time of the two fall skin tests, blood was obtained for a serologic test on each alternate positive reactor to histoplasmin. When the negative reactors were retested, either in the spring or in the fall, blood specimens were obtained from all the children whose skin tests had changed from negative to positive and on the preceding and succeeding child in the examination line. The latter procedure provided controls, children whose skin tests remained negative, for the serologic testing.

Table 1. Percentage of children positive to histoplasmin on initial test, according to age, Fort Leavenworth, Kans., 1953

Age (years)	Number tested	Number positive	Percent positive
3–4	263	5	1. 9
5–6	470	21	4. 5
7–8	314	17	5. 4
9–10	271	21	7. 7
11–12	136	21	15. 4
13–18	86	17	19. 8
Total	1, 540	102	6. 6

Serologic tests were performed by Dr. Joseph Schubert of the Communicable Disease Center, Public Health Service, Chamblee, Ga., and by Dr. Samuel Salvin of the Rocky Mountain Laboratory, Public Health Service, Hamilton, Mont. Dr. Salvin performed a precipitin test using purified histoplasmin as the antigen and a complement fixation test using whole yeast phase organisms as the antigen. Dr. Schubert performed a complement fixation test using histoplasmin as the antigen. These tests were done without knowledge of the skin test status of the individual.

Depending on the size of the child, either an 11- by 14-inch or 14- by 17-inch chest X-ray was obtained for each at the time of the initial histoplasmin skin test. At the time of the retesting similar X-rays were taken of all children whose skin tests had changed from negative to positive and on some of the children selected for controls. At the same time second X-rays were taken on the initially positive reactors who had been serologically tested in the previous examination. All X-rays were interpreted by a qualified radiologist as well as by other physicians experienced in the interpretation of chest X-rays.

During the retesting, a questionnaire was given to the parents of each child. It asked about family visits of a day or more off the post, any illnesses which had occurred in the interval between tests, and other pertinent epidemiological factors. To supplement the questionnaire data, clinical records at the outpatient clinic and the post hospital were reviewed for pertinent illnesses during the interval. Illnesses associated with upper respiratory infec-

tion, bronchitis, pneumonia, and gastrointestinal disturbances were considered pertinent and were summarized on the child's record with respect to onset and duration. Clinic records were available for 2,375 of the children. They were not available for the remaining 497, including 2 converters, because of the transfer of the father.

Basic Prevalence and Conversion Rates

In table 1 are shown the age-specific rates for histoplasmin sensitivity determined from tests of 1,540 children in September 1953. The overall prevalence is about 7 percent, with children 11 years and over showing much higher rates (average 17 percent). The percentage positive increases with age even though the geographic background of these children is varied. The prevalence of histoplasmin skin test sensitivity observed for the succeeding periods of study was similar to that for the first.

The age-specific conversion rates, shown in table 2, are based on the number of negatives that were retested at the end of each observation period and the number of children who had converted to a positive reaction during the period. Rates were calculated for the period of observation and then adjusted to a yearly rate. The total yearly rate for the first 8-month period (winter 1953–54) is about twice as high as that for either of the other two periods, and this seems attributable to an excessive rate of conversions among children aged 7–10 years during that particular period. The tendency for increasing rates of conversion with increasing age is apparent during all the periods. The 13- to 18-year-olds exhibit an annual rate of 11 percent compared with 3.6 percent for children aged 12 years or less.

Further analysis of the conversion rates is seen in table 3, which shows the rates of conversion among residents and among nonresidents of the post who returned questionnaires. Nearly all the nonresidents lived in the town of Leavenworth. The conversion rate for 144 nonresidents was 11.6 percent, whereas the rate for 2,101 residents was only 4.2 percent, one-third as high. These figures include all three observation groups. The annual conversion rates for the nonresidents were consistently higher in all 3 periods, running from 9 to 16 percent com-

Table 2. Age-specific conversion rates for histoplasmin skin test, Fort Leavenworth, Kans., 1953–55

Age (years)	Number negatives retested	Number converters	Conversion rate	
			Observation period	Annual
	Winter 1953–54			
3–6	534	12	2. 2	3. 3
7–10	429	24	5. 6	8. 4
11–18	143	7	4. 9	7. 4
Total	1, 106	43	3. 9	5. 9
	Summer 1954			
3–6	124	0	0	0
7–10	186	2	1. 1	2. 6
11–18	89	3	3. 4	8. 2
Total	399	5	1. 3	3. 1
	Winter 1954–55			
3–6	464	7	1. 5	2. 3
7–10	476	5	1. 1	1. 7
11–18	217	8	3. 7	5. 6
Total	1, 157	20	1. 7	2. 6
	All periods combined			
3–6	1, 122	19	1. 7	2. 5
7–10	1, 091	31	3. 0	4. 5
11–18	449	18	4. 4	6. 7
Total	2, 662	68	2. 8	4. 0

Table 3. Histoplasmin conversion rates among residents and nonresidents of the post, Fort Leavenworth, Kans., 1953–55

Resident status	Number negatives retested	Number converters	Percent converters	Annual conversion rate
Nonresident	144	10	6. 9	11. 6
Resident	2, 101	58	2. 8	4. 2
Total	[1] 2, 245	68	3. 0	4. 8

[1] Total returning questionnaires.

Table 4. Frequency of illness in relation to histoplasmin skin test status, Fort Leavenworth, Kans., 1953–55

Histoplasmin skin test	Total number for whom clinical records were available	Type of illness						Total persons reporting illness	
		Upper respiratory		Bronchitis and pneumonia		Gastrointestinal			
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Negative	2,140	1,434	67	271	13	132	6	1,837	86
Converter	66	38	58	7	11	4	6	49	74
Positive	169	107	63	6	4	10	6	123	73
Total	2,375	1,579	66	284	12	148	6	2,009	85

pared with 2 to 6 percent for the nonresidents. Five of the ten nonresident converters were 11 years old or more, yielding a crude conversion rate of 21 percent compared with 4 percent for residents of the same age. For those under 11 years of age, the crude rate was 4 percent for the nonresidents as opposed to 2.6 percent for residents.

Table 5. X-ray results at the examination in September 1953, Fort Leavenworth, Kans.

X-ray	Histoplasmin skin test			
	Number positive	Number negative	Total number	Percent positive
Negative	67	1,416	1,483	5
Lesion	12	10	22	55
Calcification	23	12	35	66
Total	102	1,438	1,540	7

Changes Accompanying Infection

Table 4 shows the prevalence of different types of illness among all the children for whom clinical records were available, including not only those who became infected (the converters) but those already infected (the positives) and those not infected (the negatives). The illnesses are classified as upper respiratory infection, bronchitis and pneumonia, and gastrointestinal infection.

Sixty-seven percent of the children who were histoplasmin negative had a clinical record of upper respiratory illness, while 58 percent of the converters and 63 percent of the positives reported such illnesses. For bronchitis and

Table 6. X-ray results for children who had more than one X-ray, by histoplasmin skin test status, Fort Leavenworth, Kans., 1953–55

X-ray reading on initial test and retest films	Histoplasmin skin test						Total number
	Negative		Positive		Converter		
	Number	Percent	Number	Percent	Number	Percent	
Negative—negative	29	91	75	54	43	65	147
Negative—lesion	0	0	3	2	6	9	9
Lesion—lesion	1	3	10	7	3	5	14
Calcification—calcification	2	6	52	37	14	21	68
Total	32	100	140	100	[1] 66	100	238

[1] X-rays on 2 converters misfiled and not located.

pneumonia the percentages were 13, 11, and 4, respectively. Thus there was no evidence of a greater frequency of respiratory illnesses among the converters than among either the continuously negative children or those previously infected. It is worth noting, however, that 58 percent of the converters had an upper respiratory illness and that 23 percent, or nearly half of these, had cases lasting 4 days or more.

The results of X-rays taken at the time of the original examination, in September 1953, are given in table 5. Among the children who had negative X-rays, 5 percent were histoplasmin positive. Among those who had lesions, 55 percent were histoplasmin positive, and among those who had calcification, 66 percent were positive to histoplasmin. Thus, frequent association of pulmonary calcification and lesions with positive histoplasmin skin tests is evident. Similar figures were observed for children admitted later to the study.

Table 6 shows the results of X-rays obtained on children who had X-rays both in the initial examination and on a retest, including those who had X-rays taken because of conversion of the skin tests, the negatives chosen as serologic controls, and the initial positives who had received serologic tests. Of 238 children who had more than one X-ray, 147 were negative on both the initial and the retest X-ray. Fourteen had lesions on both films and 68 showed calcification on both films. The most important happening in this phase of the study was the development by 9 children of a lesion during the period between the 2 X-rays. Six of these nine were among 66 converters, and 3 were among 140 children whose skin tests were positive at the initial examination. Thus almost 10 percent of the converters developed a lesion compared with 2 percent of the initially positive reactors. Two of the lesions which developed among the converters are illustrated in figures 1 and 2.

Table 7 shows the results of serologic tests performed on 320 children in the study. Of

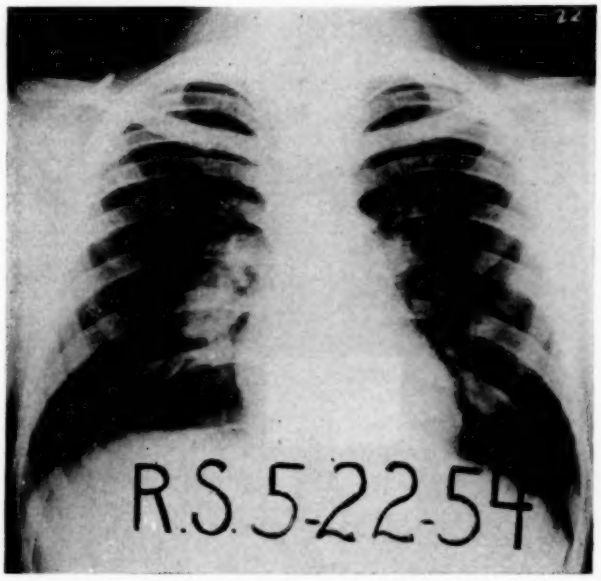


Figure 1. R. S. W. M., age 10: Histoplasmin skin test and chest X-ray negative in September 1953. Histoplasmin skin test positive in May 1954. Chest X-ray May 22, 1954, revealed enlarged right hilar lymph node. Still present July 19, 1954. Three common colds from January to April 1954; bronchitis in November 1953. Serologic tests for histoplasmosis positive May 24, 1954.

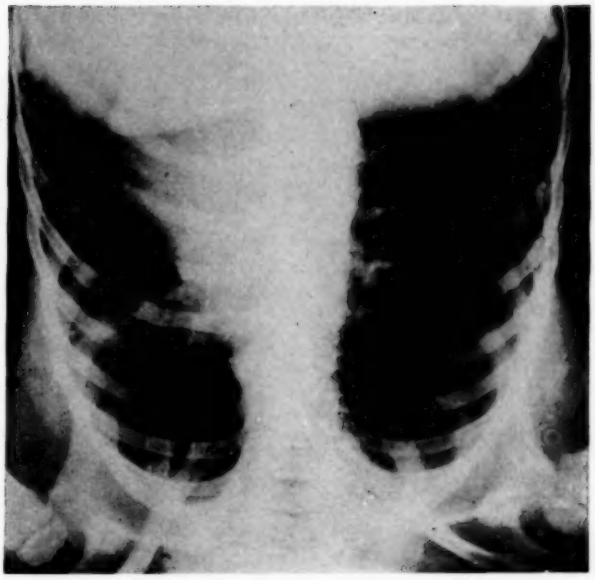


Figure 2. W. S. W. M., age 4: Histoplasmin skin and chest X-ray negative in September 1954. In May 1955 histoplasmin skin test positive, 20-mm. induration. Only illnesses were tonsillitis in January 1955 and common cold in March 1955. X-ray taken May 23, 1955, showed pneumonic area in left mid-lung extending out from hilus. Area showed little clearing 3 days later. Serologic tests for histoplasmosis positive May 18, 1955.

Table 7. Serologic test results for histoplasmin reactor groups, Fort Leavenworth, Kans., 1953–55

Histoplasmin skin test	Serologic test				
	Number positive	Number questionable	Number negative	Total number	Percent positive
Negative	3	2	109	114	2.6
Converter	13	9	40	[1] 62	21.0
Positive	10	14	120	144	6.9
Total	26	25	269	320	8.1

[1] 6 converters had no serologic tests.

these, 26, or 8 percent, had positive reactions.

Among the converters 21.0 percent had positive serologic tests, whereas among those remaining histoplasmin negative only 3, or 2.6 percent, had positive tests. Two of the latter three were low titer precipitin tests, a test for which some nonspecificity is known to exist. The remaining test was a minimal positive in the complement fixation test. Five converters had minimal positives in 1 of the 3 serology tests, 2 in the histoplasmin CF test and 3 in the yeast phase CF test. All the other converters yielded a higher response in one or more tests. Among the positive reactors in the first test, 6.9 percent had positive serologic tests.

Table 8 correlates the illness experience and the serologic and X-ray results among the converters. Of the 6 who developed a chest lesion during observation, 4 had a positive serologic test and 3 had an illness. Among the 60 who did not develop chest lesions, 7 of the 33 who had illness also had a positive serologic test; only 2 of the 22 with no illness had a positive serologic test. Whenever both illness and chest lesions occurred, serologic tests were usually positive. Children not developing lesions did not show as high a prevalence of positive serologic tests as those who did.

Epidemiology

As already noted in table 3 the conversion rate among residents of the post was about one-third that of nonresidents.

Table 9 shows a comparison of the histoplasmin conversion rate between individuals who visited off the post during the observation period and those who did not. A visit off the

Table 9. Relation of histoplasmin conversion to off-post visits, Fort Leavenworth, Kans., 1953–55

Visits	Histoplasmin skin test		
	Number of negatives retested	Number converters	Percent converters
No visits off post	1,303	33	2.5
Visits to farms	231	11	4.8
Other visits	567	14	2.5
Total	2,101	[1] 58	2.8

[1] 10 converters lived off post and were not included.

Table 8. Illness experience and results of X-rays and serologic tests for histoplasmin converters, Fort Leavenworth, Kans., 1953–55

X-ray	Illness			No illness			Total
	Positive serologic test	Negative serologic test [1]	No serologic test	Positive serologic test	Negative serologic test [1]	No serologic test	
Developed lesion	2	1	0	2	1	0	6
Did not develop lesion	7	26	2	2	20	3	60
No X-ray [2]	0	1	0	0	0	1	2
Total	9	28	2	4	21	4	68

[1] Questionable results are included with the negative serologic test.
[2] X-rays misfiled and could not be located.

Table 10. History of pigeons on roof of house in relation to results of histoplasmin skin test, Fort Leavenworth, Kans., 1953–55

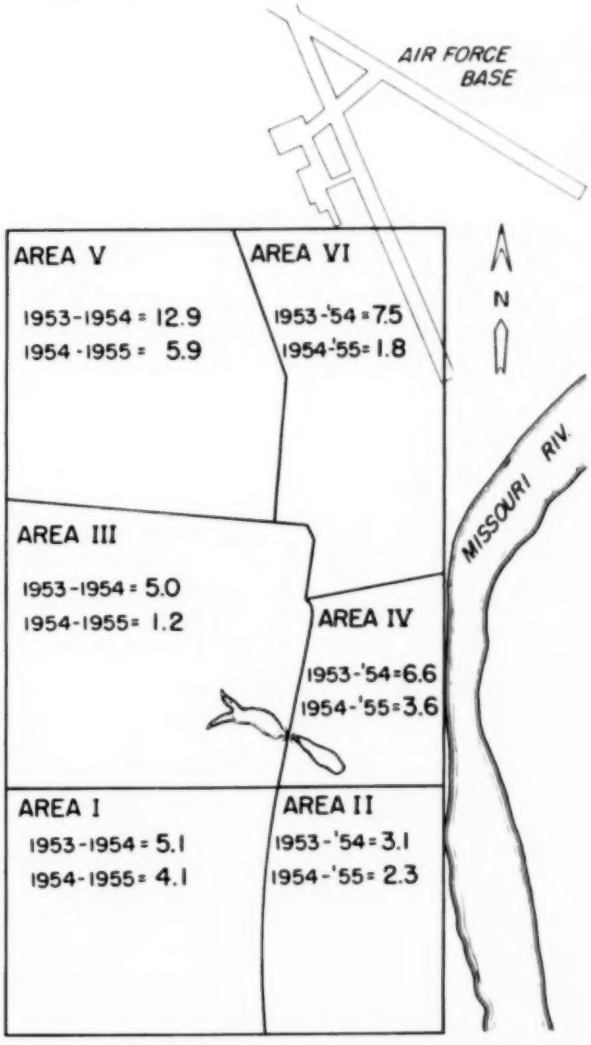
History of pigeons	Number negatives retested	Number converters	Percent converters
	Winter 1953–54		
Pigeons on roof	151	15	9.9
No pigeons on roof	783	22	2.8
Total	934	37	4.0
	Summer 1954		
Pigeons on roof	86	1	1.2
No pigeons on roof	202	2	1.0
Total	288	3	1.0
	Winter 1954–55		
Pigeons on roof	190	5	2.6
No pigeons on roof	669	12	1.8
Total	859	17	2.0
	All periods combined		
Pigeons on roof	427	21	4.9
No pigeons on roof	1,654	36	2.2
Total	2,081	57	2.7

post to a farm was apparently a considerable factor in *Histoplasma* infection, doubling the rate of conversion of the skin test. This has been commented on previously (*2*). Visits to farms, however, do not explain all the infections which occurred since 47 of the 58 converters denied visiting a farm.

Since there was evidence of infection taking place on the post, further efforts were made to locate a possible source. It is a well-known fact that histoplasmosis is often incurred in old houses, belfries, and other places in which pigeons have been roosting. Since pigeons are plentiful in the old buildings at Fort Leavenworth, the relationship between pigeons roosting on the roof of the houses and histoplasmin conversion was considered. As shown in table 10, the histoplasmin conversion rate among those reporting pigeons on their houses was more than twice that among the others on the post. This difference was most pronounced during the first observation period, the winter of 1953-54, when 10 percent of the children living in houses where pigeons roosted were histoplasmin positive, compared with 3 percent of those not so associated with pigeons.

Annual conversion rates for different areas of the post for the two winter periods are shown in figure 3. The distribution of converters is not at all uniform, area V showing the highest rates each year. These higher rates were not due solely to the concentration of pigeons men-

Figure 3. Annual histoplasmin conversion rates for five residential areas at Fort Leavenworth, 1953–55.



NOTE: Rates are adjusted to cover 12-month period.

tioned earlier because this concentration covered areas III and IV as well as V.

The extraordinary rate of histoplasmin conversion in area V led to additional investigation, which disclosed that 9 of the 12 converters during the first year lived in a large 3-story apartment house, the Beehive, which sheltered more than 50 families. These 9 converters came from a group of 97 children living in this house who were negative at the time of their first test in September 1953. Eight of the nine converters lived on the third floor, yielding a conversion rate of 27 percent for the children on this floor (table 11). The remaining converter lived on the first floor. In contrast, during the second winter observation period, only 4 of the 72 Beehive residents became histoplasmin positive, and only 1 of them lived on the third floor.

On further inquiry into the difference in conversion rates in the Beehive during the two periods, it was found that a sprinkler system had been installed in the attic of the building during the fall and early winter of 1953. The installation necessitated cutting holes for pipes through the attic floor and the ceilings and floors of the rooms below down to the basement. Furthermore, the attic had a number of broken windows, which permitted pigeons to enter and nest in the attic. Large amounts of pigeon dung were found scattered throughout the attic, and holes had been bored through some of these areas. In addition, at the time the sprinkler system was installed it was necessary to remove a false floor in the attic, an operation which created a tremendous amount of dust and unquestionably stirred up the pigeon excreta which had been deposited on this false floor. Cultures from pigeon nests in the attic obtained a year or so later, however, showed no evidence of *Histoplasma capsulatum*.

Table 11. Histoplasmin conversion rates according to floor of apartment house (Beehive), Fort Leavenworth, Kans., 1953–55

Floor	Number negatives retested	Number converters	Percent converters
	Winter 1953–54		
1st	37	1	3
2d	30	0	0
3d	30	8	27
Total	97	9	9
	Winter 1954–55		
1st	27	3	11
2d	17	0	0
3d	28	1	4
Total	72	4	6

Discussion

The frequency of clinical illness among children converting from negative to positive on the histoplasmin skin test resembled superficially that observed in *Coccidioides* infection. The percentage of converters ill with upper respiratory infection, bronchopneumonia, or bronchitis of at least 4 days' duration was 30 percent in this study, compared with 24 percent with clinical illness in Smith's survey in Army camps (*1*). Sixty percent of those who became infected with *Coccidioides* and 42 percent of those who became infected with *Histoplasma* showed no upper respiratory illness. However, the incidence of illness among converters at Fort Leavenworth differed little from that of the control groups. Whether or not the same situation prevailed in the *Coccidioides* study cannot be determined because no studies on controls were done.

That *Coccidioides* infection is sometimes even less manifest than in Smith's report is indicated by the following quotation from a presentation at the Coccidioidomycosis Conference, Phoenix, Ariz., February 11–13, 1957, by Dr. Paul G. Hugenholtz, formerly chief, Medical Service, Williams Air Force Base, Ariz.: "Forty-four converters to the coccidioidin skin test were observed among approximately 200 skin test negative recruits retested at 3-month intervals. Only 1 of these 44 is a clinically recognized case, and 5 other men had only a 'cold.' Indeed the illness was so vague that I would classify 43 of the 44 as 'inapparent infections'."

The similarity in frequency of illness among the converters and the control groups consisting of previously infected children and those

continuously negative at Fort Leavenworth is probably due to the infrequency of the *Histoplasma* infections (only 68 children among 2,662), compared with the frequency of other causes of illness; only 2.8 percent of the children became infected with *Histoplasma*, but 85 percent showed some type of illness. It may also be that *Histoplasma* infections in children are somewhat milder than infections in older people, which on the whole have been rather severe as seen in reports of epidemics of histoplasmosis. Perhaps dosage may be the important difference. It is important to note that both in the development of chest lesions and in the serologic tests a definite difference could be detected between the infected group and the control group. Certainly there is adequate evidence in the literature to substantiate the potential seriousness of both epidemic and sporadic histoplasmosis. One can only conclude that under the conditions of this study *Histoplasma* infections were not frequent enough or severe enough, or otherwise sufficiently different, so as to be distinguished from the other infections seen in the controls of similar age and with similar exposure.

The study indicates a direct relationship between the incidence of histoplasmin skin test conversions and residence off the post in Leavenworth and nearby Missouri and Kansas towns, visits to farms regardless of location, and association with pigeons. Conversion rates were especially high during the first year of the study among the top-floor residents of one large apartment house, where a sprinkler system was being installed. The remodeling required by installation of this equipment undoubtedly scattered pigeon dung deposited in the attic. The rates of infection were markedly lower the second year of the study, after the remodeling had been completed. Although *H. capsulatum* could not be demonstrated in material collected from the attic at a later date, the epidemiological data definitely point to dissemination of the infection from dry dust and pigeon manure stirred up by the remodeling.

Comparison of the prevalence of histoplasmin sensitivity among these Army children with that of natives of the area is interesting. A previous study has shown that the rate among the natives is much higher; it is about 47 percent at ages 7–8 years, as compared with about 5 percent for the Army children of these ages. The difference is further brought out in table 3, which shows that nonresidents of the post (most of whom lived in Leavenworth) had a histoplasmin conversion rate three times higher than residents of the post. Also the rates of conversion are higher among the older children than among the younger ones (table 2). This may be associated with the fact that all the children, even those living on the post, attend high school in Leavenworth and are thus exposed to the factors which account for the high local rate.

Summary

Clinical illness, development of chest lesions, and serologic changes accompanying infection with *Histoplasma capsulatum* were studied in children of United States Army personnel stationed at Fort Leavenworth, Kans. Of 2,662 with a negative reaction to the histoplasmin skin test on the first examination, 68 had a positive reaction to a second test 5 to 8 months later. Uninfected children, as well as those previously infected, served as controls for these converters.

Illness accompanying infection did not occur frequently enough to be separated from the routine upper respiratory illnesses occurring among the controls. This lack of definition may have been due to the infrequency of *Histoplasma* infections in these children (only 4 percent per year) in comparison with the frequency of upper respiratory infections (58 percent for the converters and 66 percent for the rest of the children in the study).

Chest lesions, evident on X-rays, developed more frequently among the converters than among the controls. Similarly, serologic tests were more often positive among the converters, and there was a definite relationship of serologic test results to illness and the development of chest lesions.

Epidemiological observations indicate that *Histoplasma* infections among these Army children resulted from several of various potentially infectious factors. These may be listed in the order of importance as living off the post,

visits to farms, living in a house frequented by pigeons, and, finally, living in a house where exposure to pigeon excreta unquestionably occurred.

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(*2*) Furcolow, M. L., and Ney, P. E.: Epidemiological aspects of histoplasmosis. Am. J. Hyg. 65: 264–270, June 1957.

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publications

Public Sewage Treatment Plant Construction, 1956

PHS Publication No. 549. 1957. 15 pages. 15 cents.

Fifth in a series, this report gives the number and amount of contracts awarded for the construction of sewage treatment plants by municipalities in 1956. The awards are broken down by 15 major drainage basins of the United States, by population groups, and by size of contract. Place, type of construction, and cost of each contract are listed in the appendix.

The effects of the Federal grant program under Public Law 660 (84th Cong.) are not reflected since there has not been sufficient time to determine them.

20th Anniversary of the National Cancer Institute—Commemorative Symposium

Journal of the National Cancer Institute, Vol. 19, August 1957. $2.00

Members of the staff of the National Cancer Institute, Public Health Service, have contributed special articles for this commemorative issue. Beginning with the text of the National Cancer Institute Act of August 5, 1937, they review the development and accomplishments of cancer research and programs for cancer control.

Present and former members of the National Advisory Cancer Council, present Institute staff, and deceased staff members are listed in the appendix.

A Comprehensive Program for Water Pollution Control for the Meramec River Basin

Water Pollution Series No. 72. PHS Publication No. 553. 1957. 7 pages.

One of a series presenting comprehensive pollution abatement programs developed by the States and adopted by the Surgeon General in accordance with the new Federal Water Pollution Control Act (P. L. 660, 84th Cong.), this publication summarizes the program developed by the Missouri Division of Health and the Public Health Service to control pollution in the Meramec River Drainage Basin (eastern Missouri).

The program provides an objective plan for citizens of the area and city officials and industrial leaders, farmers, fishermen, conservationists, and others. Projects (new plants, replacements, enlargements, additions) required to bring water pollution under control in the Meramec River Basin are listed. Other recommendations relate to the operation of existing municipal and industrial waste treatment works, provision of adequate sanitary facilities and practices at camps and recreation centers, and control of new and increased sources of pollution.

Barbiturates As Addicting Drugs

PHS Publication No. 545. 1957. Folder. $2.50 per 100.

Prepared by the National Institute of Mental Health, Public Health Service, this folder points out the dangers of uncontrolled, habitual use of barbiturates. It describes the symptoms of barbiturate intoxication, how experiments have proved that addiction occurs, what kind of treatment is indicated, and why further research is needed.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared by other Federal agencies.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington 25, D. C.

The Public Health Service does not supply publications other than its own.

Public Health Service Statement

X-ray Case-Finding Programs in Tuberculosis Control

SINCE the 1940's, mass radiography of the chest has been a fundamental technique in the detection of tuberculosis in this country. In 1956 approximately 70,000 new active cases of tuberculosis were discovered, a substantial portion of the total by this means.

As originally constituted, mass X-ray surveys had communitywide application and were designed to reach from 70 to 80 percent of the adult population within a limited time. The rationale that motivated this method of attack was that most of the unknown active cases in the population would be discovered and eventually isolated, treated, and rehabilitated, and that presymptomatic disease would be discovered at a stage before irreparable lung damage had been done.

The only limitation or selection imposed upon these communitywide survey enterprises, in actual practice, was a minimum age. Persons younger than 15 years of age were usually excluded because of both the difficulty of obtaining satisfactory films and the low yield of cases among children. The working assumption was that tuberculosis was a problem of the general adult population and called for widescale intensified attack.

In the last 15 years the tuberculosis problem has changed radically. There are areas of the country where active tuberculous disease is almost nonexistent. And there are many other areas where tuberculosis continues to be a serious public health and medical problem. There are a number of special groups that carry a heavy burden of tuberculosis and constitute a fertile source of future cases. Thus, tuberculosis continues to be a stubborn problem, and X-ray case finding remains a primary factor in its solution. However, the emphasis has shifted as the tuberculosis control challenge has changed.

Perceiving the nature of this change, the Public Health Service has been supporting for some time the selective use of mass X-ray survey facilities and has promoted their application in population groups at high risk of infection and disease, such as, hospital admissions, patients and employees in mental hospitals, inmates of correctional institutions, low economic groups, particularly those in slum areas, migrant laborers, alcoholics, and others. Contacts of open cases and persons with symptoms typical of tuberculosis constitute other groups that should receive prime attention in case-finding activities.

In applying the principle of selectivity, the yield of new cases should be a strongly influencing factor in establishing priorities for survey programs. Nevertheless, it is recognized that, within the identifiable types of population groups suitable for X-ray case finding, there are wide ranges in the number and rate of discoverable cases. Therefore, no nationwide priority can be established on the basis of gross categories of population. Necessarily, prior-

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This statement, approved by Surgeon General Leroy E. Burney, was prepared with the advice of:

Dr. Russell H. Morgan, Johns Hopkins University Hospital, and special consultant to the Surgeon General on the public health aspects of radiation.

Dr. Ralph Dwork, director of health, Ohio Department of Health.

Dr. Floyd Feldman, medical director, National Tuberculosis Association.

Dr. Joseph Stocklen, tuberculosis control officer, Cleveland and Cuyahoga County Health Department, Ohio.

ities should be determined by the epidemiological demands of the particular local situation. For example, the range of rates of newly discovered cases in correctional institutions indicates that this population group may deserve a very high or a very low priority, depending upon the particular local situation.

Selection of areas of case-finding activity should also be determined by the quantity and quality of available followup, diagnostic and treatment facilities, cost, availability of personnel, and by the community's potentiality for making the maximum utilizaton of survey findings. When X-ray screening is planned for any group, it is essential that facilities for differential diagnosis be provided so that virtually all clinically significant cases of tuberculosis will promptly come under medical care. Where such facilities are limited, X-ray screening programs should be so restricted as to insure adequate diagnosis and medical care of new cases found.

In low-prevalence groups, tuberculin skin testing is useful as a first step in case finding. X-ray activities could thus be restricted to reactors to tuberculin. As a result, the necessity of screening the whole population would be obviated.

In consequence, the Service proposes that every community evaluate on a continuing basis its tuberculosis problem, its specific needs and its resources, so that X-ray surveys may have maximum effect in terms of number of cases found, the reduction of the reservoir of unknown infectious cases, and, through adequate and enduring followup activities, the breaking of chains of infection.

For many years it has been known that there is a risk of excessive radiation exposure involved in the use of X-ray machines. Current findings in this field that emphasize the significance of relatively low-level radiation exposure now serve to focus attention on the need to maintain and operate X-ray equipment in such a way as to eliminate all unnecessary radiation.

To achieve this purpose, the Public Health Service recommends the following procedures: Systematic inspection should be made of all X-ray case-finding equipment, so that radiation exposure to the population may be reduced as much as possible. Photofluorographic X-ray equipment should be inspected prior to the beginning of a survey and at frequent intervals thereafter. Of particular importance in this connection are: (*a*) permanent installation of the proper size cone, so as to limit the field of radiation to the area of the fluoroscopic screen of the photofluorograph; (*b*) the interposition of a filter of at least 2½ millimeters of aluminum in the useful X-ray beam to eliminate the soft radiation; (*c*) radiation levels at locations where technical and other personnel are situated and where incoming and outgoing examinees are stationed, consistent with the standards set forth in the National Bureau of Standards Handbooks 59 and 60.

A committee of experts has had under review for some time the problems associated with radiation exposure. It is their considered judgment that the risks inherent in such exposure, although important, are relatively small compared to the very great benefits to be achieved from chest X-ray case-finding programs when conducted within the principles set forth in this document.

Summary

The following, then, are the guiding principles that unify the policy of the Public Health Service as it bears upon tuberculosis X-ray case-finding activities:

1. Mass radiography of the chest, operated under competent auspices, is a fundamental technique in the detection of tuberculosis.
2. Mass X-ray case finding should be applied selectively in groups at high risk of tuberculosis infection and disease.
3. All tuberculosis X-ray survey programs should have the prior approval of the applicable State or local health department.
4. Consideration should be given to the tuberculin test as an initial screening device in low prevalence groups.
5. Every community should evaluate on a continuing basis its tuberculosis problem, needs, and resources, so that local X-ray surveys may have efficient use and maximum effect.
6. Adequate safeguards should be utilized to protect all persons from unnecessary radiation.

Personnel Time in Nursing Homes of Washington State

ELIZABETH LAMBERTY TUCKER, R.N., M.N., and MILDRED A. SNYDER, M.P.H.

THE PLIGHT of many older citizens has created a phenomenal interest in the role of the nursing home in the care of the sick and the aged. This interest has been fanned by the rising cost of long-term hospitalization, advances in medical care and rehabilitation, and changing cultural patterns and age distribution of the population. Official health and welfare agencies are devoting more time and attention to nursing homes. The embarrassing lack of information about present practices in these homes, however, has been a severe handicap in planning construction and licensing programs.

A national inventory in 1954 reported that Washington had 3.6 beds per 1,000 population in nursing homes providing skilled nursing care, or nearly 40 beds per 1,000 population over 65 years of age (*1*). These rates are higher than the rates for any other State. Washington was the only State in 1954 having more nursing home beds (8,964) than general hospital beds (8,423).

In 1951 a nursing home licensing law was enacted by the State legislature, and in that same year rules, regulations, and standards were adopted by the Washington State Board of Health (*2*). A nursing home is defined in the law as "any home, place or institution which operates or maintains facilities providing convalescent or chronic care, or both, for a period in excess of 24 consecutive hours for three or more patients not related by blood or marriage to the operator, who by reason of illness or infirmity are unable properly to care for themselves."

The nursing home licensing law is administered jointly by the State department of health and 17 of the 37 local health departments. Public health nurses and sanitarians, under the direction of the local health officer, visit homes to assist and consult with the operator and to enforce the law and the rules and regulations. Where the local health department staff is small, personnel from the State department of health work directly with the nursing homes. In other localities, a State team consisting of a nurse and a sanitarian works with local health department staffs and arranges for additional consultant services in architecture, nutrition, or management, as needed. During 1955 there was an average of 4 public health nursing visits and 5 sanitarian visits to each home by State or local personnel.

The present study of personnel in nursing homes in Washington, undertaken in 1956, had three objectives:

1. To collect and analyze data on the number and kinds of personnel employed in the various types of nursing homes.

2. To develop from the analysis staffing guides and other related material for the various sizes and types of homes. Such guides can be used by public health nurses and nursing

Mrs. Tucker is nursing consultant in the hospital and nursing home section of the Washington State Department of Health, Seattle. Miss Snyder during the study was hospital and medical program representative, Division of Hospital and Medical Facilities, Public Health Service, in Region 9, San Francisco. She is now associate research technician with the California State Department of Social Welfare, Berkeley.

Table 1. Washington State Department of Public Assistance requirements for skilled nursing personnel in nursing homes, by shift, and monthly rate of payment for patient care, 1956 [1]

Type of home	Shift (7 days per week)			Monthly rate paid
	Day	Evening	Night	
Group I	One RN	One RN	One LPN	$180
Group II	One RN	One LPN	One LPN	145
Group III	One RN or one LPN	None	None	115
Group IV	One LPN	None	None	90

[1] In addition to the skilled nursing personnel listed, sufficient additional personnel to care adequately for the type and number of patients in the home are required.

NOTE: RN=registered nurse; LPN=licensed practical nurse.

home operators in interpreting the following section of the Laws, Rules, Regulations, and Standards, which applies to all nursing homes: "The nursing service in the home shall be the responsibility of a person employed full time as a registered nurse or a licensed practical nurse, and who has had at least 2 years' experience. Additional personnel shall be employed when the size of the service requires it, in order to give adequate care to patients."

3. To provide data that can be used to compare nursing home practice in the State of Washington with that in other States.

Collection of Data

Every year, as part of the application for renewal of license, due July 1, each nursing home must complete a weekly employee work schedule. Reported on this form are identifying data on the home, names of all employees and of the operator, hours and time of work, and type of position held by each employee, together with the license number of each registered nurse and licensed practical nurse. Included on the application for renewal are data on bed capacity, number of patients, type of home, and average daily census. From forms submitted in 1956, covering a 1-week period in May of that year, data were obtained for the study. With the assistance of the public health statistics section of the State department of health, the information was coded, punched on tabulating cards, and summarized.

Since the data were required for renewal of the nursing home license, information was obtained on all nursing homes. Similar reports have been required for the past 6 years, and frequently the data have been verified during regular public health nursing visits to the homes. For this reason, the data collected appeared to be more complete and accurate than would be expected from a questionnaire. The reporting of licensed nursing personnel is believed to be reliable because the license number for each nurse had to be included and could be verified. However, the work classification for other types of personnel, particularly in small homes, was difficult to do and probably not too accurate.

In May 1956 there were 9,680 nursing home beds in the State. The 558 beds located in nursing home units in general hospitals were excluded from the study. Information was collected from 300 licensed nursing homes and homes for the aged, which provided 9,122 beds for patient care.

Types of Homes and Patients

The Washington State Department of Public Assistance has established four groups of nursing homes as a basis of payment for nursing home care of welfare patients. A home is classified as I, II, III, or IV according to the qualifications and number of skilled nursing personnel employed in the home. The requirements for skilled nursing personnel and the rate of payment for patient care for each type of home are shown in table 1.

Medical examiners, employed by the department of public assistance, examine welfare patients, classify them into four groups, and recommend the type of nursing home care

needed. Arrangements are then made for the care of patients in homes that have the appropriate skills available. In general, patients in the four types of homes meet the following criteria:

The group I patient is usually confined to bed unless lifted out, must be fed, or helped in feeding, and cannot assist in bedmaking, bathing, or caring for himself. He may be incontinent, in need of special diet, or in need of skilled nursing service such as intravenous and oxygen therapy or special dressings.

The group II patient is usually confined to bed unless lifted out, can assist with bedmaking by rolling from side to side, and may be capable of feeding himself. He may, however, be incontinent and require parenteral medication or a special diet.

The group III patient may be on bed rest but have bathroom privileges, feed himself, and have a minor modification of a regular diet, or he may be ambulatory and require only semiprofessional nursing service.

The group IV patient is usually ambulatory, sitting up frequently, and may require simple nursing services such as oral medication and routine observation. He may present a mild mental confusion.

Pertinent to analysis of the data on personnel in Washington's nursing homes are background

Table 2. General characteristics of nursing homes in Washington, May 1956

Type and size (in beds)	Number of homes	Number of beds	Number of patients	Average occupancy (percent)	Average size (beds)
Group I	97	4, 180	3, 995	95. 6	43
12–20	13	227	213	93. 8	17
21–30	18	489	433	88. 5	27
31–40	20	709	668	94. 2	35
41–60	31	1, 515	1, 452	95. 8	49
61–129	15	1, 240	1, 229	99. 1	83
Group II	28	926	882	95. 2	33
12–40	21	537	519	96. 6	26
41–77	7	389	363	93. 3	56
Group III	151	3, 552	3, 334	93. 9	24
4–20	72	947	855	90. 3	13
21–30	54	1, 329	1, 222	91. 9	25
31–40	13	464	482	103. 9	36
41–60	6	285	283	99. 3	48
61–117	6	527	492	93. 3	88
Group IV [1]	12	245	209	85. 3	20

[1] Ranged in size from 6 to 45 beds.

Table 3. Number of persons employed in nursing homes, by type of home, Washington, May 1956

Type of personnel	Total	Group I	Group II	Group III	Group IV	Unclassed
Total	4, 074	2, 090	393	1, 323	60	208
Registered nurses [1]	508	365	51	66	4	22
Licensed practical nurses [1]	462	188	54	183	8	29
Nurse aides and orderlies	1, 591	845	149	508	10	79
Operators	158	54	12	72	10	10
Housekeeping personnel	334	151	32	126	11	14
Dietary personnel	669	316	64	246	10	33
Laundry workers	115	63	14	30	2	6
Maintenance and gardening personnel	180	76	13	74	5	12
Other personnel	57	32	4	18	0	3

[1] Includes 58 operators who are registered nurses and 91 operators who are licensed practical nurses. Some homes reported more than 1 operator.

data relating to size of the homes and other general characteristics. Such data for the 288 homes classified into one of the four groups are shown in table 2. Group I and Group III homes far outnumbered the other two types. Homes in group I tended to be larger than those in any other group, and they had more patients than even the more numerous but generally smaller homes in group III. All groups had almost a full complement of patients, the average occupancy ranging from 85.3 percent for group IV homes to 95.6 percent for group I homes.

Most of the patients in the nursing homes were welfare patients: The proportion in group I was about three-fourths and in each of the other three groups about four-fifths. The majority of the welfare patients in each type of home met the criteria for that type. For example, nearly two-thirds of the welfare patients in group I homes had a group I classification, while the other third were classified group II, group III, or group IV.

Twelve of the homes, providing 219 beds, were not classified by the department of public assistance. Although the number of personnel in these homes is reported, data on personnel time are not presented.

Types of Personnel

In May 1956, 4,074 persons were employed full time or part time in the 300 nursing homes in this study (table 3). Nurse aides and orderlies were the largest group, about 40 percent. Dietary personnel (cooks, kitchen helpers, dishwashers, and pantry girls) were the second largest group. There were 508 registered nurses and 462 licensed practical nurses employed during the study week. Two-thirds of these skilled nursing personnel were employed in group I and group II homes, where the patients generally require 24-hour skilled nursing care and supervision. There were 307 persons reported as operators of nursing homes, of whom 58 were registered nurses and 91 were licensed practical nurses. The average number of hours worked during the study week for all employees, including both part-time and full-time personnel, was 37.7 hours.

The percentage of employees who were registered nurses varied from 17.5 in group I homes to 5.0 in group III homes (table 4). In group I and in group II homes, about one-fourth of the employees were skilled nursing personnel; in group III and in group IV homes, nearly one-fifth were in this category. Approximately two-fifths of the employees are classified as nurse aides and orderlies in all types of homes, except group IV, where only 16.7 percent are so classed. More than 60 percent of the employees in group IV homes were classified as "all other."

Personnel Time Per Home

The data reported on the number of hours of employee time were analyzed separately for each group of homes and are presented in that fashion in this section. Although comparisons can be drawn among the groups, each type is considered here as a distinct entity.

Group I

The average number of hours of employee time per home per week varied from 394 for homes with 12–20 beds to 1,393 for homes with 61–129 beds (table 5). Total employee time increased as the size of the home increased. However, registered nurse time did not increase

Table 4. Percentage distribution of personnel employed in nursing homes according to type of personnel, by type of home, Washington, May 1956

Type of personnel	Total	Group I	Group II	Group III	Group IV	Unclassed
Total	100.0	100.0	100.0	100.0	100.0	100.0
Registered nurses	12.5	17.5	13.0	5.0	6.7	10.6
Licensed practical nurses	11.3	9.0	13.7	13.8	13.3	13.9
Nurse aides and orderlies	39.1	40.4	37.9	38.4	16.7	38.0
All other	37.1	33.1	35.4	42.8	63.3	37.5

Table 5. Average number of personnel hours per home per 7-day week, according to type and size of home, Washington, May 1956

Type and size (in beds)	Total	RN	LPN	Aide and orderly	Other
Group I	795	132	77	333	253
12–20	394	115	59	87	133
21–30	509	111	69	172	157
31–40	672	115	86	269	202
41–60	919	141	73	403	302
61–129	1,393	177	99	679	438
Group II	574	74	83	218	199
12–40	453	67	80	153	153
41–70	938	92	94	413	339
Group III	346	70		134	142
4–20	221	64		67	90
21–30	376	64		170	142
31–40	478	67		219	192
41–60	656	88		320	248
61–117	973	174		255	544
Group IV	223	49		37	137

RN=registered nurse; LPN=licensed practical nurse.

in this manner. The number of registered nurse hours per home per week in the 3 size groups with 40 beds or fewer averaged essentially the same as the requirement of 112 hours (day and evening shifts 7 days a week). Homes in the 2 size groups with 41 beds or more exceeded this requirement. In all sizes of homes, the requirement of 56 hours of licensed practical nurse time (night shift 7 days a week) was exceeded.

In group I homes, the duties of the registered nurse are largely those of supervision and teaching of the other nursing staff and, in some homes, include managerial or administrative tasks. Direct service to patients generally consists of administering medications, performing highly technical nursing procedures, and observing the patients. Since the pattern of registered nurse staffing appeared to be related to the requirement rather than to the size of the home or the functions of the nurses, further analysis of registered nurse hours was made (table 6).

Fifteen of the group I homes did not meet the minimum of 112 hours of registered nurse time; four of these homes had 41 beds or more. Nineteen group I homes, 16 of which were larger than 40 beds, reported more than 155 hours of registered nurse time per week. While the registered nurse hours per home ranged from 50 to more than 215, 42 homes reported between 110 and 124 hours, approximately the required amount. From the work schedules, it was noted that a number of homes employed 2 full-time registered nurses and 1 or 2 part-time registered nurses for relief on the day and evening shifts. The specific requirement appears to have a great

Table 6. Registered nurse hours reported for the study week by group I homes, by size of home, Washington, May 1956

RN hours	Number of homes		
	Total	40 beds or fewer	41 beds or more
Total	97	51	46
50–64	3	3	0
65–79	2	2	0
80–94	1	0	1
95–109	9	6	3
110–124	42	32	10
125–139	12	4	8
140–154	9	1	8
155–169	8	2	6
170–184	2	0	2
185–199	2	1	1
200–214	4	0	4
215 or more	3	0	3

NOTE: Includes registered nurse operators; no deductions were made for managerial duties.

influence on the employment of registered nurses in homes with 40 beds or fewer, but larger homes tend to employ more registered nurses than the minimum.

To remove the effect of the size of the home in analyzing registered nurse time, the hours reported for each home were divided by the number of beds. The average number of hours of registered nurse time per bed per 7-day week is shown in the tabulation below. The range was rather wide, but nearly two-thirds of the homes reported between 2.0 and 3.9 hours of registered nurse time per bed.

Hours of RN time per bed per 7-day week	*Number of homes*
Less than 2	9
2.0–2.9	31
3.0–3.9	31
4.0–4.9	11
5.0–5.9	7
6.0–6.9	3
7.0–7.9	0
8.0 or more	5
Total	97

NOTE: Includes registered nurse operators. No deductions were made for managerial duties.

Group II

The average number of hours of employee time per home per week was 574. Of this amount, 74 hours was registered nurse time and 83 hours was licensed practical nurse time (table 5). The public assistance requirement is 56 hours of registered nurse time and 112 hours of licensed practical nurse time per week. Thus the study data indicate that registered nurses were being employed rather than licensed practical nurses in some homes.

Most group II homes aspire to a group I classification, but because of physical arrangements within the home and staffing requirements, a group I classification is not always feasible or desirable.

Group III

The public assistance requirement for group III homes allows either a licensed practical nurse or a registered nurse to be in charge of nursing service. Forty-eight of these homes reported registered nurses and 103 reported licensed practical nurses in this position. In 41 of the homes the operator was either a registered nurse or a licensed practical nurse and supplied the only skilled nursing time reported.

The homes in group III reported an average of 346 hours of employee time per home per week, 70 hours of which was skilled nursing time (table 5). The number of hours ranged from 64 for homes with 4–20 beds to 174 for homes larger than 60 beds. In all size groups the requirement for skilled nursing time was exceeded. As in group I homes, the amount of skilled nursing time did not increase as the size of the home increased for homes with 40 beds or less. However, homes with more than 40 beds did have additional skilled nursing staff.

Group IV

The 12 homes in group IV averaged 223 hours of employee time per home per week, much less than the average for any other of the 3 groups (table 5). There was an average of 49 hours of skilled nursing time and 37 hours of nurse aide and orderly time per home per week.

Some of the group IV homes were formerly boarding homes for the well aged. When some of the residents in such a home became ill, nursing staff was added and the home applied for and received a nursing home license.

Skilled Nursing Hours per Shift

In group I homes a registered nurse is required to be on duty at all times during the day and evening shifts. Nearly three-fourths of the hours reported for registered nurses in these homes were on these shifts (table 7). The distribution of registered nurse hours is similar for group II homes, although the proportion was slightly higher for the day shift. Approximately two-fifths of the licensed practical nurse time was for the night shift in both group I and group II homes.

In group III homes, either a registered or a licensed practical nurse is required to be on duty at all times during the day shift. However, 17 percent of the skilled nursing time was reported on the evening and night shifts. All of the skilled nursing time in group IV homes was reported for the day shift.

Nursing Time per Patient

To compare further the four groups of homes, the average number of hours of nursing

Table 7. Percentage distribution of skilled nursing hours according to shift, by type of home, Washington, May 1956

Shift	Group I		Group II		Group III	Group IV
	RN (12,834 hours)	LPN (7,495 hours)	RN (2,065 hours)	LPN (2,329 hours)	RN or LPN (10,494 hours)	RN or LPN (586 hours)
All shifts	100. 0	100. 0	100. 0	100. 0	100. 0	100. 0
Day	40. 3	28. 2	47. 9	27. 6	68. 9	84. 8
Evening	31. 2	11. 3	31. 1	19. 2	7. 9	0
Night	9. 4	40. 2	5. 8	37. 1	9. 2	0
Relief[1]	15. 0	17. 1	11. 5	15. 7	11. 4	0
Not stated	4. 1	3. 2	3. 7	. 4	2. 6	15. 2

[1] Breakdown by time of day not given. NOTE: RN=registered nurse; LPN=licensed practical nurse.

time available per patient per 7-day week was computed for each home. Nursing time includes the hours reported for registered nurses, licensed practical nurses, nurse aides, and orderlies. Group I homes averaged slightly more than 13 hours of nursing time per patient per week, with a range of from 2 hours to more than 26 hours (table 8). More than one-third of the group I homes reported 12.0 to 13.9 hours. In group II homes, the average number of hours per patient per week was nearly 12, and the range was 6.0 to 23.9 hours. In group III homes, the average was slightly more than 9 hours per patient, with a range of from less than 2 hours to more than 26 hours. More than two-fifths of the group III homes reported 8.0 to 9.9 hours. The average for group IV homes was about 6, with a maximum of 9.9.

Table 8. Average number of nursing hours[1] per patient during the study week, by type of home, Washington, May 1956

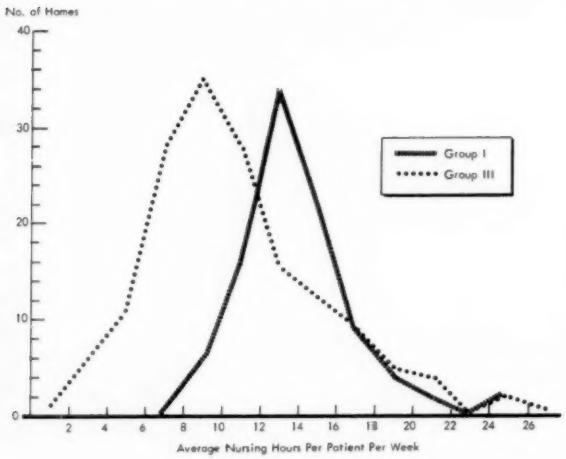
Hours per patient	Number of homes			
	Group I	Group II	Group III	Group IV
Total	97	28	151	12
0–1.9	0	0	1	1
2.0–3.9	1	0	6	3
4.0–5.9	0	0	11	2
6.0–7.9	0	2	28	2
8.0–9.9	6	3	35	4
10.0–11.9	16	9	28	0
12.0–13.9	34	8	16	0
14.0–15.9	22	2	12	0
16.0–17.9	9	3	1	0
18.0–19.9	4	0	5	0
20.0–21.9	2	0	4	0
22.0–23.9	0	1	0	0
24.0–25.9	2	0	2	0
26 or more	1	0	2	0

[1] Includes the time of registered nurse staff and operators, licensed practical nurse staff and operators, and aides and orderlies; no deductions were made for managerial duties.

Some group III homes provided more nursing time per patient per week than some group I homes (fig. 1). The variation among homes in all groups was extensive. These findings may indicate, for example, that some group III patients have the same nursing needs as group I patients. Or they may indicate that group III nursing staff may not work as efficiently as the staff in group I homes where care is directed by skilled nursing personnel and which are generally larger and perhaps better designed for nursing care. Further interpretation, however, must await additional information on patients and their need for nursing care.

Two recent publications report data on hours of nursing time per patient in nursing homes or other institutions for the chronically ill or disabled. Although these cannot be compared directly with the data for the Washington nursing homes because of differences in study methods, in types of institutions included, and in definitions of terms, it is of interest to review them here. One of the reports, from a

Figure 1. Average nursing hours per patient per week, group I and group III nursing homes, Washington, May 1956.



study of Florida nursing homes in 1955, gives 16.1 as the average number of hours of nursing service per patient per week. In this study the actual time spent by employees giving nursing service to patients was counted (*3*). In the other publication, a book by Edna Nicholson (*4*), this information appears: ". . . the average amounts of bedside service time required to maintain minimum adequate personal attention and nursing care for the residents varied from approximately 1.25 hours per patient per day in the nursing department of an institution where all the patients were ambulant and comparatively self-sufficient to more than 5 hours per patient per day in two institutions filled with seriously disabled people." Nicholson also states that an average of 22.89 hours of nursing staff time per patient per week was required for minimum adequate institutional care for chronically ill and disabled patients.

In order to evaluate adequately the relationship between skilled nursing time and other nursing time in the four groups of homes, hours reported for the three types of nursing personnel have been changed into minutes per patient per day (table 9). Group I homes provided an average of 44 minutes of skilled nursing time per patient per day, of which 28 minutes was registered nurse time; group II homes provided approximately the same amount of skilled nursing time, 43 minutes, but had less registered nurse time, 20 minutes. Group III and group IV homes provided considerably less skilled nursing time than the other two groups. Group III homes provided an average of 27 minutes, while group IV homes provided 24 minutes of skilled nursing time per patient per day.

Since group I and group II homes provided an almost equal amount of skilled nursing time per patient per day, and since group III homes provided approximately the same amount of time as group IV homes, it would appear that there are two types of nursing homes in Washington, one type, made up of the group I and group II homes, providing skilled nursing care on a 24-hour basis, and the other type, made up of the group III and group IV homes, providing limited skilled nursing services and supervision. The data also suggest that the group I patient is similar to the group II patient and has almost the same nursing needs, and that the group III patient is similar to the group IV patient.

Staffing Guides

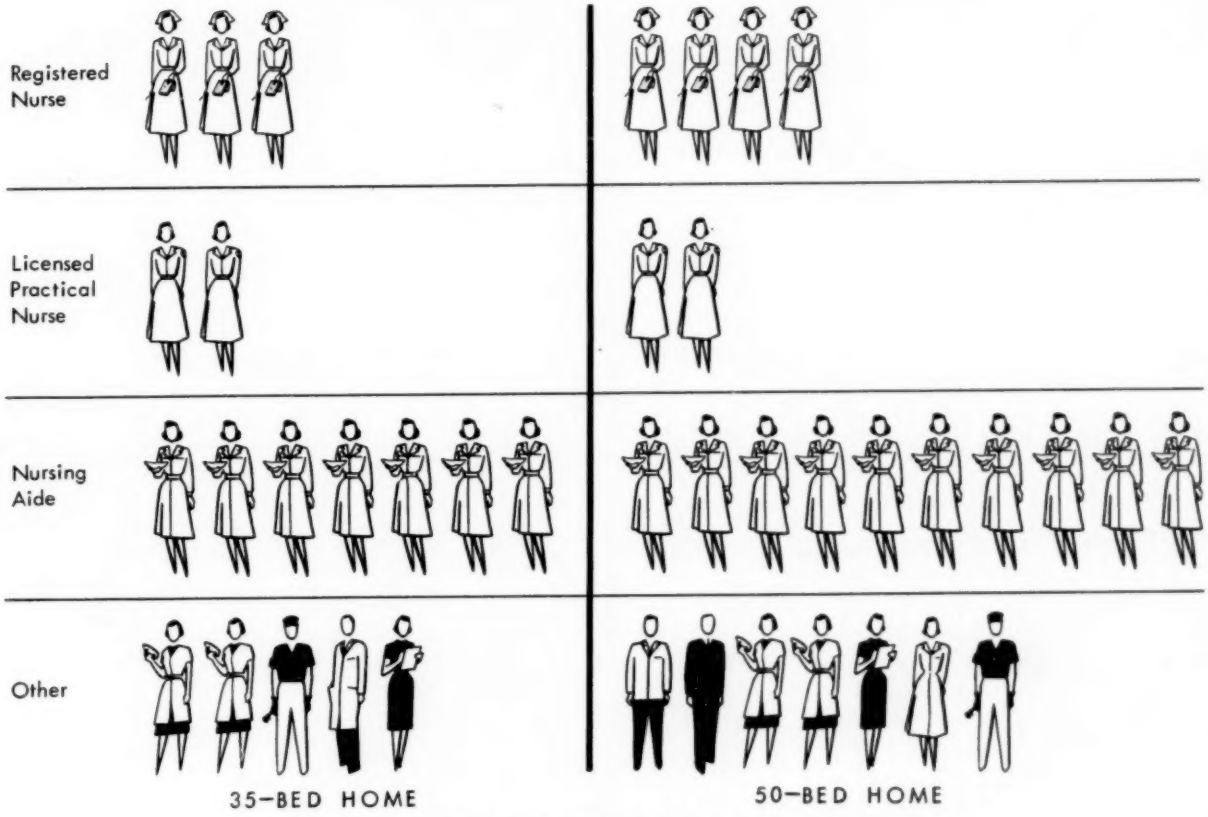
From the data reported in this study, it has been possible to develop staffing guides for "intensive care" homes (groups I and II) and for "limited care" homes (groups III and IV). For example, the study indicated that in group I homes with 31–40 beds there was an average of 115 hours of registered nurse time per week, 86 hours of licensed practical nurse time, 269 hours of nurse aide and orderly time, and 202 hours for other staff (table 5). To determine the number of full-time personnel on duty during a 7-day week, these data were

Table 9. Average number of minutes of nursing time per patient per day, according to type of nursing home, Washington, May 1956

Type of home	Total nursing	RN	LPN	Nurse aides and orderlies
Group I	113	28	16	69
Group II	102	20	23	59
Group III	79	27		52
Group IV	42	24		18

RN=registered nurse; LPN=licensed practical nurse.

Figure 2. Staffing guide for "intensive care" nursing homes.

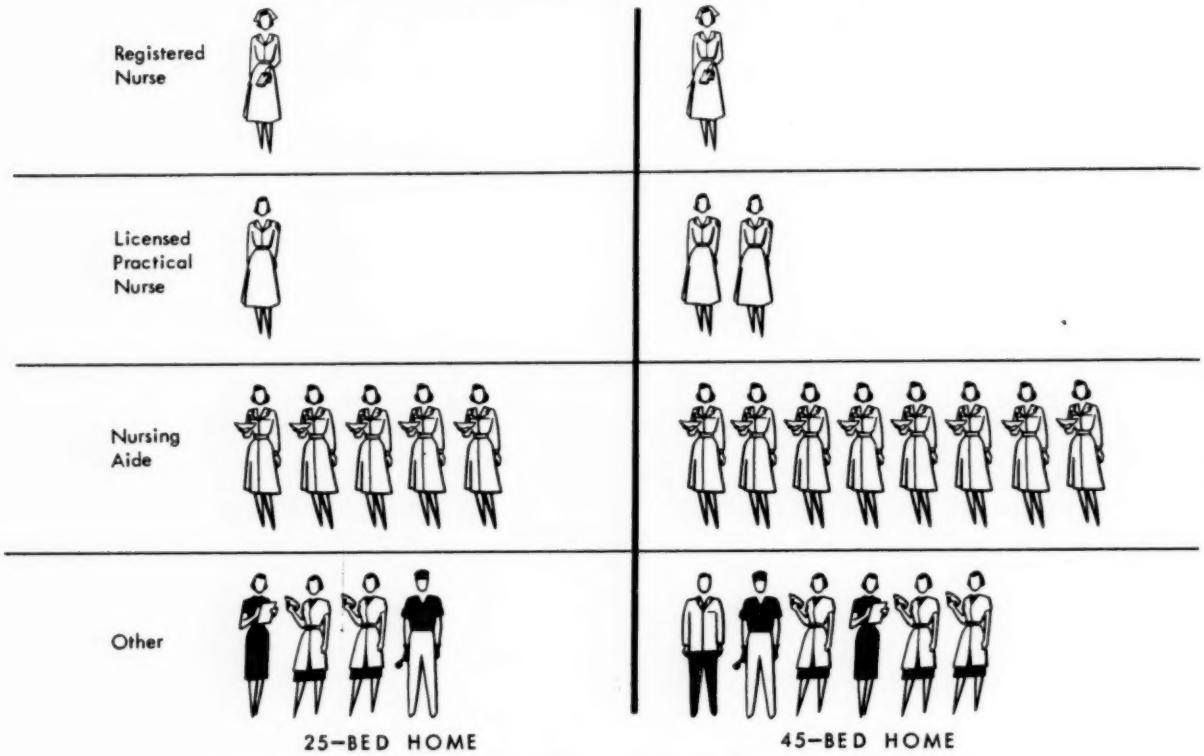


divided by 40 (for a 40-hour work week). The results for this size group I homes indicated averages of 2.8 registered nurses, 2.1 licensed practical nurses, 6.7 nurse aides and orderlies, and 5 other employees. These averages were further analyzed in terms of the work shifts to be covered during the 7-day week and other factors. The numbers were then rounded to full-time equivalents to give the suggested number of employees in the staffing guides.

Guides were developed for a 35-bed and a 50-bed "intensive care" home (fig. 2) and for a 25-bed and a 45-bed "limited care" home (fig. 3). They provide for hours of time slightly above the averages reported in May 1956. This appears to be a realistic minimum since many homes already employ more staff than suggested. It should be recognized that the number and kind of staff needed in any particular home will vary in accordance with many factors. Some of the factors that need to be considered in evaluating the adequacy of the staff are the type of patients and their need for skilled and other nursing care, the kind of facilities and equipment available, the abilities of each member of the staff, and the philosophy of the operator or management. Also to be considered are the type of medical and other rehabilitative services available, the social and recreational activities provided, and the number of volunteers used. The guides should be useful in working with new or potential nursing home operators, in evaluating staff in existing homes, and in working with other agencies.

For a 35-bed intensive care home the staffing guide provides for a registered nurse on the day and evening shifts and a licensed practical nurse on the night shift for each day of the week. It allows for 2 aides on the day shift, 1 aide on the evening shift, and 1 aide on the night shift. It also recommends an additional aide to cover the time when the workload is greatest. For homes smaller than 35 beds, aide time would be less, with the skilled staff per-

Figure 3. Staffing guide for "limited care" nursing homes.



haps performing nurse aide functions. The amount of skilled nursing time recommended is considered minimum because of the type of patient in intensive care homes.

For a 50-bed intensive care home the guide suggests that a registered nurse be on duty at all times and that, in addition, a licensed practical nurse be employed for the day shift. There would be 4 aides on the day shift, 2 aides on the evening shift, and 1 aide on the night shift. For homes larger than 50 beds additional personnel of all types probably would have to be added, and the staff organized into two or more nursing units.

For a 25-bed limited care home there would be a registered nurse on the day shift 5 days a week and a licensed practical nurse on the day shift 2 days a week and on the afternoon shift 3 days a week. The guide also allows for an aide for each shift. In a 45-bed limited care home an additional licensed practical nurse is suggested to provide for licensed practical nurse supervision on the evening shift and for relief of the registered nurse. There would be 3 aides on the day shift, 2 aides on the afternoon shift, and 1 aide at night.

Summary and Conclusions

In the State of Washington, nursing homes have been classified into four groups, the classification depending upon the qualifications and number of nursing personnel. In a study in 1956, personnel time was analyzed as to type of service and number of hours and then related to size of the homes and number of patients.

The amount of nursing time available to patients in group I homes averaged about 13 hours but varied from 2 to more than 26 hours per patient per week (7 days). One-third of these homes provided 12.0–13.9 hours of nursing time per patient per week. Nursing time per patient per day in group I homes averaged 113 minutes, 44 minutes of which was skilled nursing time.

Group II homes averaged 12 hours of nursing time per patient per week, with a range of from 6.0 to 23.9 hours. There was an average of 102

minutes of nursing time per patient per day, 43 minutes of which was skilled nursing time.

More than two-fifths of the group III homes reported 8.0 to 9.9 hours per patient per week, with an average of slightly more than 9 hours. The average number of minutes of nursing time per patient per day was 79, 27 minutes of which was skilled nursing time. Group IV homes had a maximum of 9.9 hours per patient per week and an average of 42 minutes per patient per day. Skilled nursing time in these homes averaged 24 minutes per patient per day.

Thus, group I and group II homes are quite similar in total nursing time and in skilled nursing time. There is considerable difference, however, between these two groups and groups III and IV. These two facts suggest the recommendation that there be only two types of nursing homes: intensive care homes, which provide skilled nursing care 24 hours a day, and limited care homes, in which a registered nurse or a licensed practical nurse is in charge of nursing service but not necessarily on duty at all times.

This study has demonstrated that specific requirements for skilled nursing staff influence the staffing patterns, particularly in small homes. In spite of the shortage of nurses, 24-hour skilled nursing supervision in "intensive care" homes has been required in Washington since the licensing program began in 1951. In "limited care" homes, one full-time skilled nurse in charge of the nursing service has been required. Almost all homes meet these standards, and many large ones exceed them. It is recognized, of course, that an official standard or requirement alone does not bring nurses into employment. Pleasant working conditions, intelligent personnel policies, adequate salaries, and convenient location and hours have all contributed. The present standards for skilled nursing staff appear to be realistic, and it would seem that they could be increased if indicated. Stafling guides based on data presented in the study have been developed for the recommended types of nursing homes.

The data obtained in this study raise a number of questions that will require collection of additional information. Before requirements for skilled nursing staff are changed, it is essential to learn more about the needs of patients cared for in nursing homes. Such data should be related to the information reported here and also to the specific functions of various personnel, the design of the home, and the equipment available.

This study points up one of the values of good working relationships among local health departments, welfare departments, State and local nursing home associations and nursing home operators. A cooperative effort is necessary to obtain data that can be used in planning and operating programs to improve patient care in nursing homes.

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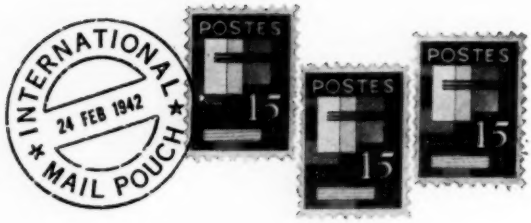

Life Without Dobbin

A group of farmers in Voinjama, northwest Liberia, live without any domestic animals except chickens. Trypanosomiasis, or sleeping sickness, has ravaged the region for centuries, leaving only chickens and a few goats as survivors. There are no jungle ungulates; in fact, it is said that in all of Liberia there are only two horses. Although the people have adjusted, the human economy is chronically handicapped by the lack of domestic animals.

—EUGENE P. CAMPBELL, M.D., *chief, Public Health Division, International Cooperation Administration.*

Doctor's Holiday

On a busman's holiday, Dr. Arno E. Town culminated his visit to Ganta, Liberia, by treating Liberian patients. Despite advance notice of his visit, a frantic chase at the last minute was necessary to collect 10 patients for him to examine. Most were beyond help but he operated on one patient for cataract. Among the local tribes many more people were treated and given instruction. The noted Philadelphia ophthalmologist was in Liberia as a guest speaker of the Northern Liberia Medical Association.

—JOHN S. MOOREHEAD, M.D., *formerly chief public health officer, U. S. Operations Mission, Liberia.*

A Well for Ricaurte

When the rural environmental sanitation program was extended to Ricaurte, Ecuador, 15,000 people attended five health film showings and villagers donoted their labor to excavate a well. Interested citizens formed a large subcommittee on health. The zone health department cooperated by supplying the services of a medical officer, sanitary inspector, and microscopist.

Ricaurte is the site of the first activities of the sanitation program in Azuay-Canar, a village near Cuenca. Health and education servicios are carrying out a community-school improvement program in the village.

—JAMES D. CALDWELL, *chief, health, welfare and housing field party, U. S. Operations Mission, Ecuador.*

Malariologist's Reward

Children in the malaria-ridden villages near Chiengmai, Thailand, were so used to having malaria all the time they didn't even know they were ill, but their blood was pale and their spirits depressed. I watched school children suffering from enlarged spleens and high temperatures trying to study and play.

In the same area 3 years after the malaria control program began, smiling children, literally blooming with health and energy, lined up for examination. As they marched toward us, my colleagues and I cheered spontaneously, anticipating triumphant findings.

Our cheering was justified! Not one of the children was infected although they lived in the heart of a previously malarious district.

—MELVIN E. GRIFFITH, M.D., *chief malariologist, U. S. Operations Mission, Thailand.*

"Kan Ho Won" Replaces "Kan Ho Bu"

"Kan ho won" will replace "Kan ho bu" if Korean nurses have their way. The term correctly used for "nurse" is "kan ho won" which means "a person who has been trained to give care and protection." At their annual meeting in Seoul the Korean Nurses Association drafted a letter requesting government authorities to use "kan ho won" rather than the old Japanese-imposed term, "kan ho bu," a woman who gives care and protection.

A "kan ho won" for 37 years, Mrs. Hyo Chung Lee, chief nurse at the Masan Tuberculosis Sanitarium, was the first Korean to receive the Florence Nightingale Medal.

—ALBERT P. KNIGHT, M.D., *chief, Health Division, U. S. Operations Mission, Korea.*

Continuity of Patient Care

CONFERENCE REPORT

MORE effective means of transmitting information between hospitals and public health nursing services in order to provide continuous care for patients was the subject of a conference held in Chicago on May 11 and 12, 1956, under the sponsorship of the departments of hospital nursing and public health nursing of the National League for Nursing.

The main aim of the conference was to encourage planned nursing services in hospitals and in agencies providing home care, although community planning was also emphasized.

Basic to all other considerations is the mechanism by which information relating to the patient's physical, psychical, and social circumstances may be transmitted as the patient moves between hospital, clinic, and home. The conferees agreed that one person, acting as coordinator and administrator, in each institution must be responsible for the effective administration of the program. All reports concerning the patient should be written, with "feedbacks," or written responses to reports, a necessary part of a fluid communication system. Conferences were recommended for the workers when the patient is admitted and discharged.

The chief concern of community planning would be to promote understanding by means of conferences, articles, and cooperation among various groups sharing the same interests. With an efficient planning committee, community needs could be ascertained in terms of the extent of service to be provided for the patient. The committee could also determine, if necessary, priority cases. In addition, the committee should establish a standard referral form, acceptable to all participants, for transmitting information.

Backgrounds for discussion were supplied by Dr. George A. Silver, chief of the division of social medicine, Montefiore Hospital, New York City; Doris Schwartz, instructor in outpatient nursing, Cornell University-New York Hospital School of Nursing; and Dr. Bess Sondel, professorial lecturer in communication, University of Chicago.

Silver, believing that "good patient care calls for attention to physical, emotional, and social factors, for consideration of what will happen after the patient leaves the hospital, for example, and of what happens before the patient comes to the hospital," stressed the need for nurses to play more extensive roles in patient care. Before they can, however, two ideas must be generally accepted, Silver pointed out. First, the nurse "needs to be involved in planning, consulted on progress, and advised of developments." Second, "the nursing part needs to be admitted into rational organization of medical care."

Given a greater role to play, the public health nurse can provide information about the patient and his family which would be welcome to the hospital nurse, while the latter, with her special knowledge of the patient's attitude toward his illness, himself, and his family, could facilitate aftercare and rehabilitation by transmitting her information to the public health nurse.

The patients who Silver feels to be most in

need of continuous care are new mothers and infants, the tuberculous, cardiacs, hemiplegics, and diabetics, those subjected to radical or mutilating surgery, the aged, the mentally ill, and children suffering from long-term illnesses.

The nursing service, he asserted, "must now organize its services to the sick so as to include a continuity of concern in and out of the hospital." He emphasized the need for a discharge planning conference to establish a bridge between private and public nursing services. The discharge planning conference would enable the doctor, nurse, social worker, nutritionist, and physical and occupational therapist to describe the obstacles and adjuvants to continuing patient care in the home. Furthermore, information coming back, after a patient has been at home for a time, will provide additional educational material for all those participating in the conference. It is important to the field nurse's morale, Silver added, that her reports be read and answered.

Miss Schwartz gave a brief history of a referral system begun in 1939 between the Henry Street Visiting Nurse Service and the New York Hospital, and expanded through the years until, in 1946, the Greater New York Interagency Referral System was established.

The objective of a good referral system, Schwartz declared, is to provide continuous nursing care. Such a referral system implies well-established communication lines, planned conferences, visits to patients' homes before discharge, and the establishment of a close relationship among those professionally involved.

In order to make a referral system work, continuous nursing care must be seen as a legitimate nursing function, and as the kind of care that can be provided by good liaison between the hospital and the community nursing agencies. And it should be adopted as a goal that "no patient who would benefit by public health nursing referral, following a hospital or clinic experience, should go unnursed or poorly nursed through the failure of nurses to consider the appropriateness of such a referral."

If the patient's problems are kept central, Schwartz believes, any antagonisms which may arise among the groups can be overcome.

Samples of interagency referrals were provided. These referrals include reports by the physician, hospital nurse, physical and occupational therapists, dietitian, medical social worker, and public health nurse.

Sondel described the exercise of feedback as a means of improving communication. Unless a communicator is able to learn how her information is received and interpreted, she is unable to judge whether or not she is being understood, and whether her purpose in giving information is being carried out. Through feedbacks from those who have used the information, a nurse learns to see her work in relation to that of others, gains greater understanding of the importance of sharing information, and learns how to make her reports more helpful to others. It is important, therefore, that a means of reporting back on information received be provided.

Sondel discussed the effect of nonverbal communication, the flexibility needed to acquire deeper understanding of what is communicated to an observer, and the stability in discourse which is obtained from a critical examination of the patterns words make, with reliance upon one's own examined pattern.

A summary of the conference, including verbatim accounts of the addresses, is available to the public. Published as "Hospitals and Public Health Nursing Services Plan Better Care," it can be purchased for $1.00 from the Department of Public Health Nursing, National League for Nursing, 2 Park Avenue, New York 16, N. Y.

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